Success of First-Term Soldiers

The Effects of Recruiting Practices and Recruit Characteristics

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Preface

The research in this monograph examines the relationship between recruiting practices and conditions and the first-term success of U.S. Army soldiers. The Assistant Secretary of the Army for Manpower and Reserve Affairs and the Army's Deputy Chief of Staff, G-1, sponsored the research.

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Background and Purpose

Recruiting is expensive. On average, it costs the U.S. Army about $15,000 to recruit one soldier,[1] and it must recruit 80,000 to 90,000 each year. If a soldier fails to complete his or her first term, the Army must spend a like amount for a replacement. Thus, it is very much in the Army's interest to minimize losses at every phase of the first term. This has become more important in recent years because the Army, during the lean recruiting years in the late 1990s, vigorously expanded its recruiting effort by adding and expanding enlistment incentives, by increasing recruiting resources, and by modifying recruiting practices.

This monograph focuses on the implications of these decisions for the manning and success of first-term soldiers. It also examines how the Army manages first-term soldiers. Training losses and retention problems drive up the demand for new recruits. Given the expense of recruiting and training losses, the Army should assess whether different management strategies could improve the success rates for first-term soldiers. It may be possible to cut attrition without compromising Army standards.

The research reported here is based on Army contracts for non-prior-service enlisted personnel for FY1995 through FY2001. Since the focus was on first-term success, it did not use data from more re-

[1] DoD estimated Army recruiting costs at over $14,000 per recruit in FY2001 (Asch et al., 2002). The Army was using $15,000+ in FY2003.

cent years. Many recruits in the FY2002 cohort did not join until FY2003, and we could only observe their attrition behavior for the first year or so of their term. Many recruits in the FY2002 cohort did not join until FY2003,[2] and we could only observe their attrition behavior for the first year or so of their term. Still, the database used is quite rich, containing information on about 550,000 enlistment contracts.

The research examines recruit progress at various steps during the first term.

- Delayed Entry Program (DEP)[3] attrition.
- Fitness program participation (for recruits who fail the initial fitness exam).
- Basic Combat Training (BCT) attrition.
- Early attrition (separation in the first 6 months).
- First-term attrition (separation in the first 36 months).
- First-term promotion to sergeant.
- First-term reenlistment.

At each step, the analysis examines several types of factors that might affect recruit success. First, individual background and demographic characteristics may affect how well recruits do in the first term or their match with the Army. Second, features of the enlistment contract have implications for Army manning. For example, if the Army succeeds in attracting recruits for longer terms (and these soldiers complete these terms), then it can reduce its recruiting mission for maintaining a steady-state force. Third, when the recruiting environment is poor and the Army is struggling to meet missions, recruiters might accept more "marginal" recruits who are ill-suited to the Army than they would in a strong recruiting period. If so, these mar-

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[2] For our purposes, since we are examining the effects of recruiting practices and recruit characteristics *at the time of recruitment,* we group soldiers by "cohort" based on the dates of their contracts.

[3] DEP is now called the Future Soldier Program. This document will maintain the reference to DEP, since this is the program that was in effect for the soldiers whose attrition patterns we examined.

ginal recruits might wash out in the DEP and early attrition and provide little service to the Army. Fourth, recruiter characteristics might predict how well an individual recruit does in the Army. For example, recruits might identify with a young recruiter or a recruiter from the local area, and this process might produce recruits who are better matched with the Army.

The key results are described below and summarized in Figure S.1.[4]

What Makes a Difference

Length of time in the Delayed Entry Program (DEP). The data show that the longer an individual spends in the DEP, the higher the DEP attrition rate. A long time in the DEP means that the new recruit has substantial time to change his or her mind about enlistment. By reducing the time that non–high school seniors spend in the DEP, the Army has succeeded in driving down DEP losses by attracting more recruits who are willing to accept short DEP times. However, an important gauge of whether the DEP loss rates have improved would be whether we would expect recruits with identical characteristics, features of their enlistment contract, recruiting environment, and recruiter characteristics to have higher or lower attrition in FY2001 than in FY1995. Our attrition model, which holds constant factors other than DEP time, shows that the adjusted rate actually rises by

[4] Some of the categories in Table S.1 were not applicable to the analysis of some of the first-term outcomes. Recruit occupation is not likely to have a direct effect on DEP attrition, fitness participation, BCT attrition, or early attrition, because the recruit has not yet reached his or her first assignment in the occupation. Much of the initial orientation and training is similar across occupations. Fitness training unit (FTU) participation is only observed for recruits who complete DEP, so it is not relevant to the model of DEP attrition. We examine whether FTU participants complete BCT and the first six months, but we did not look at subsequent performance in the first term. The goal of the program is to prepare recruits for the rigors of these initial training months, so we did not expect a direct effect of the program beyond these months. Finally, the effects of BCT and the timing of training were not relevant for recruits who did not complete DEP. We did not expect any direct effects of the BCT/timing variables on either the promotion or retention models.

Figure S.1
Summary of Key Results

	DEP attrition	Fitness participation	BCT attrition	Early attrition	First-term attrition	E-5 promotion	Reenlistment
Time in DEP	√	√	X	X	X	X	X
Gender and education	√	√	√	√	√	√	√
FTU participation	NA	NA	√	√	NA	NA	NA
BCT base/ time	NA	√	√	√	X	NA	NA
Occupation	NA	NA	NA	NA	√	√	√
ACF, bonus, enlistment length	√	X	X	X	X	√	√
Recruiting environment	√	X	X	X	X	X	X
Recruiter characteristics	√	X	X	X	X	X	X

√ Makes a difference X Makes no or modest difference NA Not applicable

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0.4 percentage points. Noteworthy, however, is the fact that actual time in DEP has little bearing on how well recruits do in BCT or in Advanced Individual Training (AIT). Thus, the Army should investigate whether greater emphasis on reducing DEP losses is cost-effective.

The Army should weight the broad implications of changes in DEP policy on both recruiting and the success of new recruits in the Army. A large DEP pool helps dampen short-term fluctuations in the recruiting market. At some point, however, new recruits may be uncertain about their plans and less likely to subsequently follow through and start active duty. Even if high school seniors are cheaper to recruit than graduates, these costs might be offset by the higher loss rate in DEP and the subsequent cost of recruiting a replacement.

Gender and education. Women and recruits with GEDs (General Educational Development certification) drop out at higher rates than do men and recruits with high school diplomas. For example, women have persistently higher loss rates at each step from DEP through the first six months. For each 100 contracts, more women than men leave during DEP, and the pattern continues in BCT and AIT. For each 100 men recruited, 76 actually complete the first six months of active duty. For each 100 women recruited, only 63 will be left after six months. Put another way, if the Army expected to fill the same number of first assignment positions with women as with men, they would need to recruit 83 men for each 100 women. The pattern for soldiers with GEDs varies somewhat from that of women, but these soldiers still depart at greater rates than do comparable soldiers with high school diplomas. Recruits with GEDs do fine in DEP and BCT, but their loss rates begin to rise in the AIT period. One hundred new GED recruits translates into 69 recruits completing training. For high school graduates and seniors, the number is 74 recruits successfully completing training.

The problem continues through the first term. Only 40 of 100 women complete their first term, compared with 59 men. The numbers for GEDs are about the same as for women, with only 43 of 100 recruits with GEDs remaining by the end of the first term. Interestingly enough, women who do complete their first term tend to reenlist at a somewhat higher rate than their male counterparts, suggesting that the women who remain at that point like their military career opportunities.

Participation in fitness training units. Individuals who enter the Army in poor physical condition are unlikely to complete their initial training. New recruits are assigned to fitness training units (FTU) if they fail an initial fitness test that is administered at the reception station at each training base.[5] The course is intended to prepare new re-

[5] The Army has restructured its fitness training recently, and the FTU program in effect for recent cohorts has been abandoned. The Army is now asking recruiters to monitor the fitness levels of new recruits in the DEP, so that new recruits will arrive at the reception station

cruits for the physical demands of BCT and reduce injuries during BCT. A key question is whether FTU participants are able to meet fitness standards and do well in training.

The evidence suggests that they do not. We analyzed this issue using a propensity score methodology that attempts to replicate an experimental design by comparing outcomes (attrition) for otherwise very similar individuals. Individuals are aligned based on their predicted probability of FTU assignment at each base in each month, and each FTU participant is matched with a nonparticipant with a similar probability of using FTU assignment. This matching of participants and nonparticipants balances the two groups on the observed factors that affect FTU assignment. The results from the propensity score model suggest that FTU training is doing little to counter the tendency of its participants to struggle in the Army. The overall probability of an FTU participant leaving during the first six months (early attrition) is 28 percent, as compared with a rate of 16 percent for the group of matched controls not selected for FTU.[6] Interestingly enough, fewer FTU participants depart the Army for fitness reasons; performance and conduct cause most departures. This suggests that FTU participants may have other problems in addition to fitness when they join the Army.

Why do the fitness trainees fare so poorly? The evidence is incomplete, but three (possibly interrelated) types of effects are possible. Drill instructors may view these recruits as substandard for not arriving in proper condition and may be less tolerant of any infractions. FTU participants may be discouraged by failing the initial fitness

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prepared to pass an entry-level fitness screen. This program is new, and we are not aware of any analysis of its efficacy.

The Army also has rehabilitation units at the training bases for recruits who are sick or injured during training. These units are designed to help these recruits get back in physical condition and continue their training.

[6] Our results do not suggest that FTU participation "causes" these recruits to have higher early attrition than nonparticipants with similar characteristics. Rather, participants may have some unmeasured characteristic that makes them poor prospects for the Army. If low initial fitness levels are difficult to overcome, then perhaps the Army should implement a better test for these skills in DEP. Alternatively, perhaps the Army needs to restructure the FTU programs to improve their effectiveness.

screen and have second thoughts about their decision to join the Army. Or it may be inherently impossible or impractical to condition some unfit recruits.

BCT base and time effects. BCT attrition varies substantially across bases and at each base over time. A comparable[7] recruit arriving at Fort Jackson in some months would have a 12 percent chance of failing as compared with only a 3.2 percent chance of failure at Fort Knox. In principle, high attrition rates might reflect a stricter standard of conduct and appropriately screened recruits who were unlikely to succeed in the Army. However, the results showed that the BCT attrition rate of each base/month cohort has no correlation with the subsequent attrition rate of the cohort. Indeed, the high loss rates in BCT, if they reflect higher standards, *may* be inappropriately screening out many recruits with good downstream potential.

Occupation. All other things equal, combat arms soldiers have higher attrition and lower reenlistment rates than do soldiers in other occupations. The reasons are unclear. These different attrition and reenlistment rates may reflect cultural differences in how problems are handled in combat units. Or they may reflect the nature of the duty. Combat soldiers may be frustrated by frequent arduous field exercises that entail considerable time away from comforts and families. Combat jobs have no civilian counterparts, so first-term soldiers may see little payoff to successfully completing their terms. At the end of their terms, combat soldiers might be anxious to leave the Army and acquire civilian job skills.

Promotion. Early promotions have a strong effect on first-term reenlistment and help the Army retain a leadership core for the enlisted force. Some soldiers are identified as "fast burners" by their units and given early promotions to E4. These soldiers tend to continue on a fast track for sergeant (E5) and are much more likely to reenlist than are similar soldiers who are promoted at an average or slower pace. The mean promotion time for four-year enlistees who make sergeant in the first term is 38 months. The model results indi-

[7] Note this means we are controlling for gender and other demographic differences across bases.

cate that 53 percent of recruits with promotions at 38 months will reenlist, as compared with the overall rate of about 46 percent.

What Makes No or Only a Modest Difference

Army College Fund (ACF), bonuses, and term length. These characteristics of enlistment contract have little bearing on first-term attrition rates. While these programs might help attract new recruits, the evidence shows that recruits attracted in this way do not have significantly different first-term attrition. Moreover, after controlling for recruit characteristics, occupation, and promotion speed, ACF participants are neither more nor less likely to reenlist at the end of the first term. Bonus recipients are actually more likely to stay than are other comparable recruits who do not receive an enlistment bonus. These results suggest that the Army should not be concerned that ACF and bonuses attract recruits who are prone to leave at the end of the first term.[8]

Recruiting environment. During lean recruiting times, recruiters may face increased pressure to meet recruiting targets. If recruits are rushed through the enlistment process at the end of a month or at some other deadline to meet the recruiting station mission, it might be "good" for recruiting, but these gains might be offset if the recruits brought in this way fare poorly in the first term. However, the evidence shows that recruiting environment has little effect on how well recruits do in the first term. There is some evidence that recruiting station pressures affect DEP and training attrition, but the effects wane later in the term. In other words, the effect of "rushing" recruits shows up in the demographics of the recruits rushed, not as a direct result of the rushing. If the rushed recruits are disproportionately

[8] This study examines the effects of enlistment options conditional on the decision to access in the Army. Enlistment options also affect the decision to join the Army, and these enlistment effects may confound the effects on first-term outcomes reported in this study. A more complete approach would require systematic variation in enlistment options to different recruits in a controlled experiment.

members of high-attrition groups, they will demonstrate higher attrition rates.

Recruiter characteristics. The results show little evidence that some types of recruiters are better at identifying good matches for the Army than are others. Recent policies emphasize younger recruiters or return recruiters to their home states. Our evidence shows that these types of policies have little downstream effect on how well recruits do during the first term. For example, an Omaha senior might relate well to a young recruiter from the Omaha area and be more likely to join the Army, but we see little evidence that this recruit is better matched and more likely to succeed in the first term. These policies may well pay dividends if these recruiters generate more contracts, but the Army should monitor this issue closely to determine whether targeting recruiters in this way leads to an increase in contracts.

What the Army Should Do

Demographic and background characteristics are key factors determining the probability of first-term success. At each stage in the first term, some groups are more likely to succeed than are others. This is not to say that the Army should abandon the groups that do not do well. But we do suggest that the Army could target its efforts more precisely to focus on the members of these at-risk groups who have the highest chances of success. Of course, this targeting process should also consider the recruiting costs of alternative recruiting strategies—certainly, the downstream performance of alternative types of recruits should be evaluated in deciding how to allocate the recruiting effort. Also, some programs do not appear to be giving the Army a reasonable return on its investment, and the Army should rethink them. We recommend that the Army take the following actions:

Shorten DEP for high school seniors. The current policy of recruiting seniors early in their graduation year results in high DEP attrition rates. The Army and other services should consider a coordi-

nated policy change to delay signing up seniors until later in the school year when their plans are more firmly entrenched.[9]

Consider alternatives for fitness screening and subsequent handling of recruits. The evidence shows that individuals who fail their initial fitness screen at the reception station are unlikely to complete the first six months of training. It may be the case that recruits who fail to meet some minimum threshold of fitness are unsuitable for the Army or too much of an institutional investment to prepare for training. Perhaps they should be screened out by tougher recruiting standards or better prepared for the Army during the DEP period.

Monitor effectiveness of training standards and policies. The large swings in BCT attrition rates suggest inconsistent application of training standards and policies. The evidence does not support the idea that tougher standards at some places or times have any bearing on the first-term success of recruits who complete training. The Army should carefully investigate what training conduct and performance standards are consistent with subsequent AIT and post-training success. The goal should not be to standardize or lower rates arbitrarily but rather to identify what problems can be mediated and what problems are precursors to longer-term failure.

Investigate policies to help at-risk demographic groups. Army recruiting cannot afford to screen out women, GEDs, and other groups who collectively have high attrition rates. The Army needs to determine whether it can do a better job in informing these groups about what is expected of them in the Army and preparing them to meet those expectations. In addition, the Army should develop programs to help at-risk recruits adapt to the Army and show them how they can improve their chances of success. Finally, screens that would

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[9] The goal of driving down DEP losses should be tempered by two factors. First, some planning flexibility is useful to prospective recruits, so shortened DEP may increase recruiting costs. Second, some recruits who have second thoughts about the Army and leave during DEP may be ill-suited for service. Army resource costs would increase if unhappy recruits complete DEP, start active duty, and then fail early in the first term.

aid in accomplishing these goals might also help identify at-risk individuals even in groups that normally have low attrition.

Monitor whether the promotion system rewards the most able. Promotion speed is an important factor in shaping first-term reenlistment and the quality of the career enlisted force. We did not analyze the intricacies of the Army promotion system, but early promotion is an important sign of progress and encourages soldiers to reenlist. If the promotion system correctly identifies "quality" early in the term, then early promotions are building an effective core of unit leadership. Alternatively, however, if some potential leaders are overlooked in the first term, they may be frustrated and leave the Army. Given the critical role played by promotions, the Army should review whether the system is identifying what factors are important for leadership success in each occupation and strengthen incentives for reaching well-specified milestones.

Get better data. Collecting data is certainly not a glamorous endeavor, but systematic and comprehensive data systems are the key to identifying what policies succeed or fail. Specifically, the Army should consider the following:

- **Build an integrated, automated system to track recruit problems, remediation efforts, and results.** Current automated data files provide too little information about attrition. In addition, the Army should track a history of problems and remediation efforts that were taken to address those problems. This new information system would help the Army identify the underlying reasons for attrition and structure policies to address those reasons. The tracking information would also help the Army sort out what types of interventions and mediations are effective.
- **Implement new programs with an eye to evaluation.** As the Army implements reforms in training and first-term personnel policy, it should carefully document the timing, nature, and application of the reforms, so the success or failure of each reform can be assessed. While full-scale evaluation of each change is not necessary, careful documentation provides the potential for sub-

stantive follow-up of the reasons for a shift in training success, attrition, or reenlistment behavior.

- **Collect detailed information about working conditions in Army occupations.** Current analysis of attrition, promotion, and reenlistment decisions is hampered by little systematic information about working conditions, and the way these conditions are perceived by soldiers in different occupations. The information would include data on weekly hours, schedule uncertainty, dangers, personnel tempo, time away from home, and other factors that are likely to differ across occupations. This would help the Army identify what specific attributes of military jobs are related to attrition or reenlistment problems. While some of this information is already available, we recognize that gathering the additional information will add to the administrative burden. Still, even a modest improvement in retention could translate into substantial dollar savings and reduce the administrative burden of processing soldiers who leave early.

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Abbreviations

ACF	Army College Fund
ADS	Active Duty Survey
AFQT	Armed Forces Qualification Test
AIT	Advanced Individual Training
ATRRS	Army Training Requirements and Resources System
BCT	Basic Combat Training
BLS	Bureau of Labor Statistics
DEP	Delayed Entry Program (recently renamed the Future Soldier Program)
DMDC	Defense Manpower Data Center
DoD	Department of Defense
EAF	Enhanced Applicant File
EMF	Enlisted Master File
ETS	Expiration of Term of Service
FORMIS	Forces, Readiness, and Manpower Information System
FTU	Fitness Training Unit
GED	General Educational Development (i.e., an alternative high school–leaving credential obtained by passing an examination)

MOS	Military Occupational Specialty
TIG	Time in grade
TIS	Time in service
USAREC	United States Army Recruiting Command

CHAPTER ONE

Introduction

Background and Purpose

An important long-term challenge for the Army has been recruiting sufficient numbers of non-prior-service enlisted members to fill first-term authorizations. During lean recruiting years in the late 1990s, the Army vigorously expanded its recruiting effort by adding and expanding enlistment incentives, by increasing recruiting resources, and by modifying recruiting practices (Warner, Simon, and Payne, 2001). These changes helped reverse the Army's recruiting shortfall and have led to strong recruiting years for FY2000 through FY2003. Of course, much of that recruiting success was related to a weak economy and, possibly, the patriotic fervor for the war against terrorism (Schmitt, 2003). These favorable circumstances may change in the years ahead.

This monograph focuses on the implications of these recruiting decisions for the manning and success of first-term soldiers. How do changes in recruiting practices affect recruits' success during training and their first term of service? How many recruits will join the career force? Are recruits likely to be promoted and provide a leadership core for the future Army? The answers to these questions will shape accession requirements and the overall Army manning picture over the next several years. If addressed in advance, they can also help the Army restructure recruiting to concentrate its resources where they will be most productive.[1]

[1] DoD estimated Army recruiting costs at over $14,000 per recruit in FY2001 (Asch et al., 2002). The Army was using $15,000+ in FY2003.

In addition to our assessment of recruiting, the research examines how the Army manages its first-term soldiers. Training losses and retention problems create demands for new recruits. Given the tight recruiting market, the Army should reassess whether some management strategies could improve the success rates for first-term soldiers. There may be potential for reducing attrition without compromising Army standards. If the Army can mitigate some problems and refocus some young recruits, it can effectively reduce the long-term demand for new recruits.

While recruiting has been relatively strong in recent years, the historical evidence suggests that changes in the economy and current events may significantly alter the recruiting environment. Even when recruiting is strong, however, the cost of recruiting and training over 80,000 new soldiers is large. About 20 percent of recruits who sign an Army enlistment contract never even start active duty, and another 36 percent of those who do start active duty fail to complete their first term. The Army may never be able to recruit sufficient numbers of "ideal" recruits to eliminate all attrition,[2] but the research is designed to identify ways to improve first-term recruiting and management practices to improve the likelihood that soldiers will succeed in the first term.

The research examines several aspects of progress during the first term. Attrition at various phases is a "bad" outcome for the Army in the sense that new costs must be incurred to recruit and possibly train a replacement. Some recruits are not sufficiently proficient, well behaved, or motivated to serve in the Army. However, if recruits are not well suited to the Army, then early losses may save training investments and problems in operational units.

- **Delayed Entry Program (DEP) attrition.** When new recruits sign an active-duty contract, they enter the DEP and promise to leave for active-duty service at some time in the next twelve

[2] Pre-existing medical or physical conditions, for example, are also a major cause of early attrition and may be difficult to discern in advance. This monograph concentrates on recruiting practices and more discernible recruit characteristics.

months. This delay allows the Army to maintain an inventory of recruits and to dampen swings in demand for training seats. The delay also allows the recruit to finish school or spend extra time with friends and family before moving on to active duty.

- **Fitness program participation.** During the period of our study, new soldiers were given an initial fitness exam soon after their arrival at their training base. Those who failed this exam were sent for a few weeks to a remedial fitness program before starting normal training.[3]
- **Basic Combat Training (BCT) attrition.** New soldiers are typically sent through a two-month orientation to basic soldier skills.
- **Early attrition.** After BCT training, recruits attend Advanced Individual Training (AIT) for training in their military occupational specialty (MOS).[4] The length and nature of AIT training varies from MOS to MOS. Military personnel researchers define early attrition as attrition during the first six months of active-duty service. This period roughly reflects the average length of combined BCT and AIT training.
- **First-term attrition.** This is defined as separation during the first 36 months of active-duty service. Some soldiers have longer initial enlistments, but attrition rates are measured at a common point to ease comparisons. A few soldiers have two-year enlistments, and we will make special adjustments to compare their

[3] The Army has restructured its approach to fitness assessments and preparation recently, and the fitness training unit (FTU) program in effect for the cohorts we studied has been abandoned. The Army is now giving soldiers a physical fitness assessment (PFA) prior to the time they go to basic training. Soldiers who do not meet the standards of this PFA are encouraged to take a self-paced physical fitness program. This is intended to improve the likelihood that new recruits will arrive at the reception station prepared to pass an entry-level fitness screen. This program is new, and we are not aware of any analysis of its efficacy. The Army also has rehabilitation units at the training bases for recruits who are sick or injured during training. These units are designed to help these recruits get back in physical condition and continue their training.

[4] Some MOSs combined BCT and AIT into one-station unit training (OSUT). OSUT is common in combat jobs. The training is integrated at the same place and in the same units.

loss rates over the first term to soldiers whose enlistments are for at least 36 months.

- **First-term promotion.** A key measure of success in the Army is the time required for promotion to sergeant. All other things being equal, early promotion is an indication that the soldier is doing well in the Army.
- **First-term reenlistment.** If recruits complete their first terms and stay, then the demand for new recruits is reduced.

Several types of factors affect these recruit outcomes. First, recruit background and demographics may affect how well recruits do in the first term or their match with the Army. Second, features of the enlistment contract have implications for Army manning. For example, if the Army succeeds in attracting recruits for longer terms (and these soldiers complete these terms), then the Army can reduce its recruiting mission for maintaining a steady-state force. Third, when the recruiting environment is poor and the Army is struggling to meet missions, recruiters might accept more "marginal" recruits who are ill-suited to the Army than they would in a strong recruiting period. If so, these marginal recruits might wash out in the DEP and early attrition and provide little service to the Army. Fourth, recruiter characteristics might predict how well an individual recruit does in the Army. For example, recruits might identify with a young recruiter or a recruiter from the local area, and this process might produce recruits who are better matched with the Army.

How the Report Is Organized

The report consists of nine chapters. Chapter Two describes the data and analysis framework used. Chapters Three through Seven examine factors that affect DEP attrition, fitness training participation, BCT attrition, early attrition, and first-term attrition respectively. Promotion and reenlistment are examined together in Chapter Eight. The chapters for each first-term outcome are divided into three sections: (1) the background and trend for each outcome, (2) an analysis of

what factors affect the outcome, and (3) the implications of the analysis for the Army. The chapters on first-term outcomes are written as separate, modular pieces: readers with an interest in BCT attrition or first-term reenlistment could skip to those chapters without reading the intervening ones. Chapter Nine presents our conclusions and recommendations.

CHAPTER TWO

Data and Analysis Framework

Background

The data are based on Army contracts for non-prior-service enlisted personnel for FY1995 through FY2001. More recent years were not used, because our focus is on tracking recruit success through the first term. Many recruits in the FY2002 cohort did not join until FY2003, and we could only observe their attrition behavior for the first year or so of their term. The total number of contracts over the seven cohorts is nearly 550,000.

Figure 2.1 shows that the level and mix of contracts has varied considerably over these seven cohorts. The low number of contracts in FY1995 reflects the end of the drawdown period after the Cold War. In the 1980s, the Army wrote about 120,000 contracts per year, but downsizing in the early 1990s substantially reduced the demand for new recruits. With low demand, the Army was able to be selective in admitting individuals with strong backgrounds. The share of high-quality recruits (recruits scoring in the top half of the Armed Forces Qualification Test (AFQT) and holding at least a high school diploma) was at about 63 percent in FY1995. As the drawdown ended, the Army attracted more recruits in FY1996 and FY1997, but the quality marks declined. In FY1998 and FY1999, the civilian economy boomed, and Army recruiting struggled, accepting more low-quality recruits to satisfy requirements. In FY2000 and FY2001, new recruiting programs and a weaker economy helped the Army increase its numbers, but the quality of the cohorts was lower than for most of the earlier years.

Figure 2.1
Trends in Non-Prior-Service Contracts and Percent of High-Quality Contracts for FY1995 Through FY2001

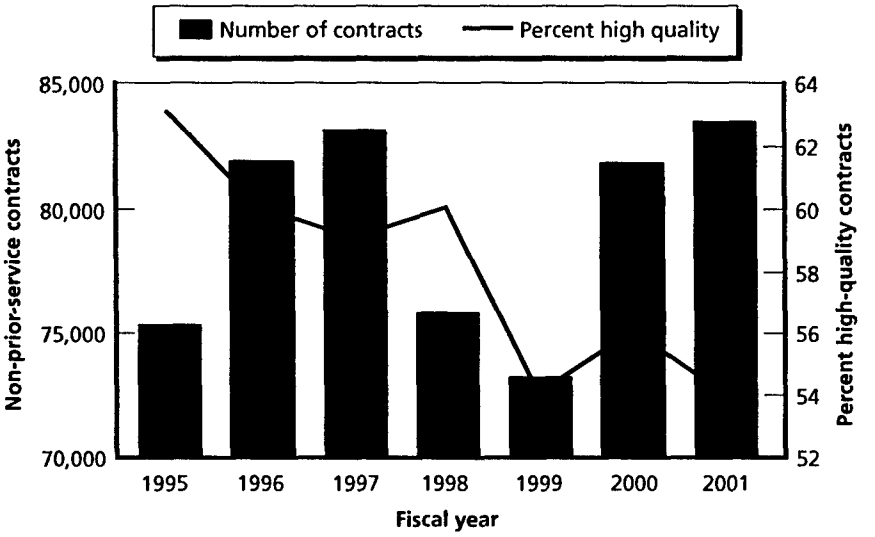

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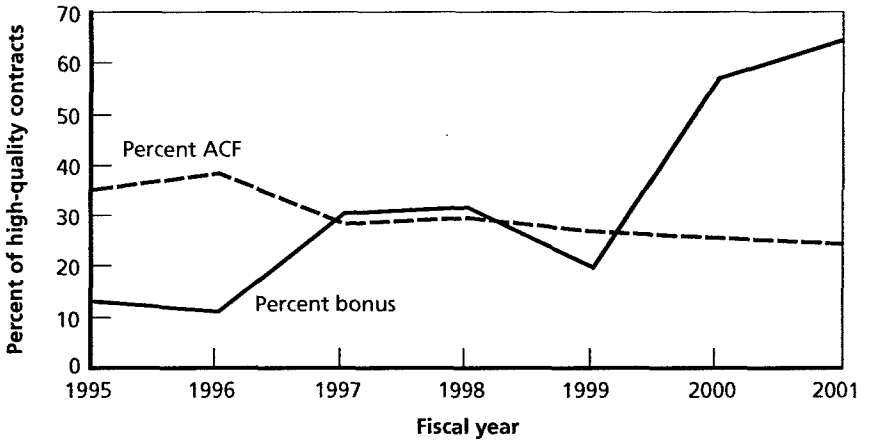
Figure 2.2 shows trends in two key enlistment options for high-quality recruits over these cohorts. Army College Fund (ACF) and bonus programs are enlistment incentives that are used to attract more recruits and to channel recruits into hard-to-fill jobs or longer enlistment terms. ACF provides funding for post-service educational training. The ACF funds augment traditional GI Bill funding that is available to all recruits. Fewer recruits are receiving ACF options over time, but the downward trend is modest. In contrast, the Army sharply increased its use of enlistment bonus options, with 64 percent of high-quality recruits receiving some type of bonus in FY2001.

Comprehensive Individual Data on First Term

As part of this project, we built a comprehensive record on each individual recruit. The record tracks a recruit from the contract through

Figure 2.2
Trends in ACF and Bonus Incentives for High-Quality Contracts for FY1995 through FY2001



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training until separation (at or before the end of the first term) or reenlistment. Several personnel files were merged to gain a complete picture of the recruit's first term:

- **Enhanced Applicant File (EAF).** The primary database for the analysis is the EAF, which is maintained by the U.S. Army Recruiting Command (USAREC). The database contains comprehensive information on recruit characteristics, features of the enlistment contract, and a recruiter identifier.
- **Enlisted Master File (EMF).** This file contains information on all enlisted personnel and shows the status of each enlisted soldier in the Army from month to month. The file was used to track changes in soldier characteristics during the first term and to identify when soldiers reenlist or separate from the Army. The EMF was also used to collect information on the characteristics of each recruit's recruiter.
- **Army Training Requirements and Resources System (ATRRS).** The ATRRS lists information about the training courses taken

by each soldier. The file was used to identify BCT, fitness, and AIT courses taken by new recruits as well as the training locations and graduation status.

- **USAREC recruiting information.** USAREC also provided information on recruiting missions and achievement for all recruiting stations and battalions.
- **Bureau of Labor Statistics (BLS).** The BLS maintains a monthly time series of unemployment rates for each county in the United States. EAF information on the recruit's home county was used to merge information on local unemployment conditions to the recruit's data record.

Tables 2.1 through 2.4 show the range of information used in our analysis. Most of the variables are self-explanatory, but a few clarifications are useful. Many of the variables such as female, Hispanic, and single with children are binary factors associated with a factor or group of mutually exclusive factors. For example, the analysis will show the effect of female and male recruits as compared with one another, so an attrition effect of five percentage points for female recruits means that we expect female recruits to have attrition rates five percentage points higher than those of otherwise comparable male recruits. Some variables reflect the effects within a group, like the education and term length variables. An attrition effect of minus three percentage points for the "some college" variable means that a typical recruit with some college has an attrition rate three percentage points lower than a similar high school diploma graduate.

For each recruit, the body mass index is defined as recruit weight (in kilograms) divided by height (in meters) squared. A recruit is considered to be overweight if his or her body mass index was greater than or equal to 25 (National Heart, Lung, and Blood Institute, 1998). In an earlier study (Buddin, 1989), we found that overweight recruits had higher attrition than other recruits.

The local unemployment rate is used in the analysis as a measure of civilian opportunities in the recruit's hometown. If individuals are

Table 2.1
Recruit Characteristics and Features of Enlistment Contract

Variable	Source
Recruit characteristics	
Female	EAF
African American	EAF
Hispanic	EAF
Asian	EAF
Married with no children	EAF
Married with children	EAF
Single with children	EAF
Age at time of contract	EAF
Overweight	EAF
General Educational Development (GED) graduate	EAF
High school senior at time of contract	EAF
Some college	EAF
College degree	EAF
Trigonometry	EAF
Geometry	EAF
AFQT	EAF
Unemployment at contract (county level)	BLS
Unemployment at accession (county level)	BLS
Features of enlistment contract	
Army College Fund	EAF
No bonus	EAF
Bonus amount (in thousands of dollars)	EAF
Paygrade E2 at entry	EAF
Paygrade E3 at entry	EAF
Paygrade E4–E6 at entry	EAF
Two-year term	EAF
Three-year term	EAF
Five-year term	EAF
Six-year term	EAF
Months in Delayed Entry Program	EAF

motivated to enlist by poor economic conditions, they may face pressures to complete their first term that are different from those of individuals who join for other reasons. There is no direct measure of individual motivation to join the Army, but individuals from high-unemployment areas may see the Army as a better long-term prospect than do similar individuals from areas where the unemployment rate is low.

Table 2.2
Recruiting Environment and Recruiter Characteristics Fiscal Year Trends, and BCT Training Base

Variable	Source
Recruiting environment	
Contract in last 5 days of month (recruiting month)	EAF
Contract on last day of month (recruiting month)	EAF
Station/battalion met mission	USAREC
First contract for recruiter	EAF
Only contract for recruiter	EAF
Recruiter characteristics	
Assignment in home state	EMF
College degree	EMF
Some college	EMF
GED	EMF
Female	EMF
African American	EMF
Hispanic	EMF
Asian	EMF
Married	EMF
Divorced	EMF
AFQT	EMF
Age	EMF
Experience of recruiter (in months)	EMF

Several factors represent the recruiting environment when the recruit joined the Army (see Table 2.2). USAREC assigns missions (targets or goals) to recruiting battalions and stations to encourage recruiting effort. Warner, Simon, and Payne (2001) and Dertouzos (1985) have shown that these mission assignments have a substantial effect on recruiters and that recruiters adjust their behavior to "game" the missions. One element of the missioning incentive system is that recruiters may face high end-of-the-month pressure to sign marginal recruits and make the mission. Anecdotal evidence from recruiters indicates that prospects face unusual pressures to sign a contract late in the month as the recruiters desperately try to make mission. We constructed variables that indicate whether the recruit's contract was signed either on the last day of the recruiting month or in the last five days of the recruiting month. These variables will measure whether

these late-month contracts are poor matches for the Army and have above-average attrition rates.[1]

USAREC missioning data were used to construct a variable that indicates whether the recruit's recruiting station/battalion met mission for the month when the contract was signed.[2] USAREC changed the mission rules, so that the mission was sometimes set at the station and sometimes at the battalion during the period from FY1995 through FY2001.

We also constructed variables on the status of the recruit's recruiter. A variable identifies whether the contract is the first contract written by the recruiter. The premise is that brand new recruiters might have little judgment about unmeasured factors like motivation and commitment that are important for success in the Army. Alternatively, however, new recruiters might be enthusiastic and spend extra time mentoring their early recruits.

Another variable identifies whether the contract is the first, last, or only contract written by the recruiter. Anecdotal discussions with recruiters suggested that some individuals have a poor temperament for recruiting and struggle to write any contracts. These recruiters are eventually reassigned to other duty, but they face great pressure to produce while they are serving as recruiters. The expectation of some experienced recruiters is that the recruits lured into the Army in these circumstances may be poorly suited for the Army and unlikely to last long.[3]

Table 2.3 lists several other groups of variables that are used in the analysis of some outcomes. Most models adjust for the recruit's

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[1] End-of-the-month pressure might be greater in a station that is near mission than at a station that is well below mission. As a station approaches mission, recruiters may pressure recruits to sign up and push the station to the mission. In preliminary statistical work, we explored this issue and found no evidence to support the argument.

[2] In early runs, we tried other approaches to looking at the effects of meeting mission on first-term success. We looked at the percent of mission achieved and found a weak link between this factor and first-term attrition.

[3] An alternative interpretation of these recruiter effects would be that "bad" recruiters only attract recruits who are particularly committed to joining the Army.

Table 2.3
Fiscal Year Trends, BCT Training Base, Deployments, and Occupation Groups

Variable	Source
Fiscal year trends	
1996 Contract/Accession/ETS	EAF
1997 Contract/Accession/ETS	EAF
1998 Contract/Accession/ETS	EAF
1999 Contract/Accession/ETS	EAF
2000 Contract/Accession/ETS	EAF
2001 Contract/Accession/ETS	EAF
BCT training	
Fort Knox	ATRRS
Fort Jackson	ATRRS
Fort Sill	ATRRS
Fort Leonard Wood	ATRRS
Deployment history	
Deployed 0–1 months/year	Datacom/DB
Deployed 1–2 months/year	Datacom/DB
Deployed more than 3 months/year	Datacom/DB
Occupation group	
Electronic Equipment Repair	EMF
Communication/Intelligence	EMF
Health Care	EMF
Other Technical	EMF
Functional Support/Admin	EMF
Electrical/Mechanical Repair	EMF
Craftsmen	EMF
Service/Supply Handler	EMF
Promotion factors	
Time to E4	EMF
Change in E5 authorization	FORMIS

cohort or year group. For some purposes, the cohort is based on when the recruits signed their enlistment contract and agreed to enter the Army. In other cases, the relevant year group is better based on the recruit's accession date, so attrition comparisons are made between recruits who are passing through training stages at the same times. Finally, the promotion and reenlistment analysis will control for the cohort that is defined by the expiration of term of service (ETS), i.e., the year in which the soldier's first enlistment term ends.

BCT is offered at several sites. In earlier analysis (Buddin, 1988), BCT loss rates differed substantially from base to base, even after controlling for the mix of recruits that were sent to different locations. The analysis will examine whether attrition rates differ by base, after adjusting for other factors in the attrition model.

The promotion and reenlistment analysis used information on humanitarian and operational deployments during the first term. The information is derived from a quarterly history of deployment information from the Datacom/DB Enlisted Database (Sortor and Polich, 2001).[4] The analysis variables were based on the number of months deployed per year during the first term.[5]

Promotion and reenlistment decisions are likely to differ across occupations. The Army has a large array of diverse jobs. With little or no lateral entry, the Army promotes to fill vacancies, and promotion speed differs somewhat across occupations. Similarly, reenlistment rates are likely to vary with occupations, because some occupations are more demanding than others and because civilian opportunities are substantial for soldiers with some military skills.

Promotion to sergeant is affected by how long it took the recruit to reach E4 as well as changes in sergeant authorizations in the recruit's occupation. "Fast burners" who are promoted to E4 early have demonstrated the ability to master their military job, so we would

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[4] These deployments are based on direct Army personnel records of individual soldiers deployed. In other research (Hosek and Totten, 1998; Hosek and Totten, 2002), deployment information is built from pay records for hostile duty pay and family separation pay. We are not aware of any direct comparisons between the measures.

Datacom/DB includes information on deployments for major training exercises, Combat Training Center, and training exercises off installation. We had hoped to examine the effects of these training deployments as well, but the data system does not report these events consistently over time. The Army began reporting any overnight training exercises in FY2001, but most of these exercises were not reported for the previous year. Given these data limitations for training deployments, we restricted our analysis to humanitarian and operational deployments.

[5] In early analysis, we attempted to distinguish between hostile and nonhostile deployment. About 85 percent of our deployments were hostile, however, and we could not find significant differences in the effects of hostile and nonhostile deployments.

Table 2.4
Measures of First-Term Outcomes

Variable	Source
Delayed Entry Program attrition	EAF
Fitness training participation	ATRRS
BCT attrition	EMF
Early attrition	EMF
Thirty-six month attrition	EMF
Time to promotion to E4	EMF
Time to promotion to E5	EMF
First-term reenlistment	EMF

expect these soldiers to have an edge in promotion to E5. Changes in Army endstrength and force structure affect the number of sergeant authorizations in each occupation every year. If "extra" sergeant slots are created in an occupation, then promotion speed should increase as occupation managers fill the empty positions. The authorizations data were drawn from DMDC's Forces, Readiness, and Manpower Information System (FORMIS).

The measures of first-term success are mostly constructed from the EMF (see Table 2.4). The exceptions are DEP attrition, which is reported in the EAF, and fitness training participation, which is documented in the ATRRS.

Analysis Framework

The main tool used for assessing how various factors affect first-term outcomes is probit regression. The model is used because most of the outcomes (except time to promotion) are discrete outcomes, i.e., a recruit either completes the first six months of active duty or is discharged during that time. The probability of an outcome (say early attrition) is modeled as a function of a vector of characteristics associated with each soldier:

$$y_i^* = \beta' x_i + u_i ,$$

where y_i^* represents the underlying index of the outcome for the ith soldier, x_i is a $1 \times (k + 1)$ vector of factors (e.g., recruit characteristics, features of enlistment contract, recruiting environment, and recruiter characteristics), β is a $(k + 1) \times 1$ vector of estimated parameters, and k is the number of factors in the model. In practice, the "true" probability that a soldier will leave is unobservable, but we do know whether a soldier stays or leaves at various points in the first term. The observed outcome is defined as $y = 1$ if $y_i^* > 0$ and $y = 0$ otherwise. The model is then estimated by probit regression:

$$\Phi(\beta' x_i) = \int_{-\infty}^{\beta' x_i} \frac{1}{(2\pi)^{1/2}} \exp(-t^2 / 2) dt ,$$

where Φ is the cumulative normal function.

The interpretation of coefficient in the model is complicated somewhat by the fact that the β-vector reflects changes in a standardized normal variate. The change in the probability of the outcome with respect to the kth factor is

$$\frac{\partial}{\partial x_{ik}} \Phi(\beta' x_i) = \phi(\beta' x_i) \beta_k ,$$

where ϕ is the normal density function. The density function can be evaluated for any values of x, but we will normally evaluate the function for a representative or average recruit. This derivative is the effect of the kth factor on the outcome.

In our models, many of the variables are discrete, so it is useful to consider the change in the discrete variable relative to the excluded outcome. For example, the effect of being female on early attrition is the difference in the probability of attrition for a female and male recruit with otherwise identical characteristics and circumstances. In this case,

$$\beta_k = \Phi(\beta' \bar{x}_1) - \Phi(\beta' \bar{x}_0) ,$$

where all values of the x-vector are evaluated at the same values except that the value for the kth factor is set equal to one in the first cumulative function and equal to zero in the second.

A short example is useful to clarify how the probit model works and how the results will be reported in future chapters. Table 2.5 shows early attrition as a function of female, education level, and age at entry. The average early attrition rate over the seven cohorts is about 15 percent. The results indicate how the pattern of early attrition varies by gender, education level, and age. The coefficient shows how much each variable affects the index function (βx_i). The standard error reflects the precision of each coefficient estimate. The effect is the predicted change in the probability of early attrition for a continuous variable like age at entry or the effect of a discrete change for an indicator variable like female. The final column in Table 2.5 shows the mean value for each variable.

The key column for the interpretation of how a variable affects early attrition is the "effect" column. The probability of early attrition for a female recruit is about 10 percentage points higher than for a male recruit. The model says that about 23 percent of female recruits will leave during the first six months as compared with 13 percent of similar male recruits. The age effect is measured continuously and shows that a one-year increment in age is associated with a 0.2 percentage point increase in the probability of early attrition (this effect is statistically different from zero, but the magnitude seems small).

The interpretation of education level is somewhat different, because education is classified into several mutually exclusive groups. The reference group for education is high school diploma graduates, so each education variable is interpreted relative to this group. The results show that recruits with a GED have early attrition rates 8.5 percentage points higher than comparable recruits with a high school diploma. High school seniors are expected to have early attrition rates 2.2 percentage points lower than recruits who have already graduated from high school. Recruits with some college or a college degree are less likely to complete the first term than are recruits with only a high school graduation diploma, but the effect for some college is not statistically different from zero.

Table 2.5
Illustration of Probit Regression Model for Early Attrition

Variable	Coefficient	Standard Error	Effect	Means
Recruit characteristics				
Female	0.3852*	0.0056	0.0982	0.1985
Age at time of contract	0.0077*	0.0009	0.0017	20.5850
GED	0.3297*	0.0075	0.0854	0.0999
Senior at time of contract	–0.0973*	0.0061	–0.0216	0.2807
Some college	–0.0122	0.0123	–0.0027	0.0407
College degree	–0.3015*	0.0178	–0.0583	0.0245
Constant	–1.2942*	0.0196		

*Significantly different from zero at the 5 percent confidence level.

The magnitude and importance of effects in different models is largely a subjective judgment, but two factors are important. First, the effect should be weighted against the overall scale of the outcome under consideration. For example, a one percentage point difference in BCT attrition for some demographic group might be more "noteworthy" than a one percentage point difference in first-term attrition. The average BCT and first-term attrition rates are about 7 and 36 percent, respectively, so a one percentage point increase in this base is a much larger percentage increase for BCT attrition than for first-term attrition. Second, the policy implications of an effect depend on the cost of implementing an alternative policy. For example, the "high" attrition rate of GEDs in Table 2.5 suggests that the Army would be better off recruiting high school graduates instead of GEDs. Graduates are more expensive to recruit than GEDs, however, so it may not be cost-effective to refocus the recruiting effort.

The model specification in Table 2.5 is meant as an illustration of the probit method and how our results will be reported in later chapters. A more complete model would consider many more factors that might affect the various first-term outcomes. These factors were described in Tables 2.1 through 2.4.

What Can the Army Learn from the Results?

Before turning to the analysis, it is useful to consider how the results might be used. For example, what if some types of recruits are unlikely to stay? What if some recruiters are more prone to find recruits who do really well in the Army? In later chapters, we elaborate on more specific results, but at this point, we describe the general manner in which the results can be used to help the Army.

Recruit Characteristics

The traditional view is that attrition differences among individuals could be used to "screen out" recruits with poor chances of success. For example, attrition findings in the early 1980s showed that non–high school graduates had attrition rates twice those of high school diploma graduates. This finding led the Army to shift resources away from this recruiting group and invest more effort in attracting other recruits with better chances of success in the Army.

With large accession requirements, the Army has been reluctant to exclude large market segments even if they do poorly in the Army. In addition, the Army is concerned about the social representativeness of the force and is sensitive to excluding or limiting groups. Even if we found that single recruits or recruits from areas with low employment had high attrition, the Army (and taxpayers) would probably find it unpalatable to exclude or limit accessions from these groups.

While reluctant to exclude groups of recruits, the Army can nevertheless use the results to target resources and programs to help groups with problems. If overweight recruits have high attrition rates in BCT, then the Army could consider remedial fitness or diet programs that might help more recruits make it through training. If low AFQT recruits or recruits with GEDs have high attrition rates, then the Army might use this information to restrict their occupational choices to jobs with short training times (where the Army has a shorter payback period to recoup its training investment).

The other reason that the controls for recruit characteristics are important in modeling first-term outcomes is that these adjustments are needed to isolate the role of recruiting environment and service

experiences in influencing attrition and reenlistment. Some training bases might have above-average attrition because their recruits are drawn from demographic groups that are attrition prone. The analysis will identify whether base attrition is high *conditional* on the mix of recruits assigned to the base.

Features of the Enlistment Contract

The positive recruiting effects of ACF, bonus, and shorter terms should be balanced against possible effects that these programs might have on completion of the first term and reenlistment into the career force. If the programs attract recruits with less commitment to the Army than others, then those individuals may have higher attrition, lower performance, and less concern about promotion because they plan to serve only one term in the Army. In addition, they may be less likely to reenlist, so the Army will need to cycle more people through the system at increased costs for recruiting and training.

The interpretation of these incentive and term effects is complicated by the fact that the choice of these options might be jointly determined with attrition and reenlistment decisions. The Army would like to know whether a change in incentives would change the attrition or retention behavior of individuals entering the Army. The ideal approach for answering this question would be to construct an experiment that would allow us to track the decisions of individuals who were at the margin for enlisting and only entered because of an extra benefit. Absent a formal experiment, the results presented here are conditional on the individual's choice of a particular enlistment incentive as part of their contract. For some individuals, this incentive will be critical to their decision. Given the widespread availability of ACF and bonuses for high-quality recruits, many of the individuals receiving these incentives would probably have enlisted in the Army even without the incentives. For some individuals, the plan to sign up for one term and then go to college with ACF money is "locked in" at the time of the contract. It might appear that these individuals leave at the end of the first term "because" of ACF, when in fact they enlisted only because of ACF. For many recruits, however, ACF may not have been critical to their decision or their plans may change after

enlistment, so it is useful to see whether the pull of post-service money for college is large when they reach their first-term decision point.

Recruiting Environment

If recruiting pressure is linked with poor first-term outcomes, the Army should consider revising its recruiting pressures to dampen those adverse outcomes. Missioning policies may need to be viewed in a broader sense than their short-term implications for the number of contracts signed. Policies to rush recruits through the enlistment process at the end of the month might be "good" for recruiting, but these gains might be more than offset by attracting recruits who fare poorly in the first term.

Recruiter Characteristics

As the Army selects recruiters, it should consider whether some types of soldiers are better suited for recruiting than are others. In recent years, USAREC has shifted the emphasis toward younger recruiters and returning recruiters to their home areas (Gaddis, 2000; Maude, 2001). The idea is that prospective recruits will more easily identify with younger recruiters from similar backgrounds. The hope is that this reorientation of the recruiter force will help attract greater numbers of recruits to the Army.

This study looks at the downstream effects of these new types of recruiters on the success of first-term soldiers. An important question is whether the recruiter characteristics have any effect on how well recruits do in the DEP and during the first term. For example, it might be an empty victory for the Army if younger recruiters attract impressionable individuals who wash out early in training.

CHAPTER THREE

DEP Attrition

Background

DEP is a program that benefits the Army and prospective recruits alike. The program allows new recruits to postpone their entry to active duty for up to twelve months. The delay allows the Army to coordinate training schedules months in advance and make efficient use of training resources. In addition, the program allows the Army to maintain an inventory of recruits and dampen any short-term changes in the number of individuals signing an enlistment contract. On the recruit side, DEP allows individuals to plan their career choice months in advance, while completing work, school, and family obligations. Many high school seniors sign their enlistment contracts in the fall or winter of their senior year and enter in the summer or fall following graduation.

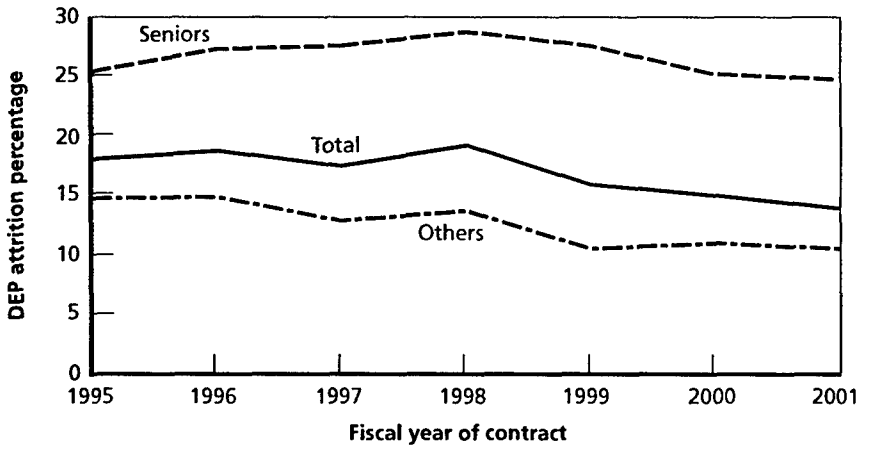
In recent years, about 17 percent of individuals who sign Army enlistment contracts separate from the Army before ever starting active duty. This DEP attrition imposes substantial additional costs on Army recruiting, since new resources must be spent to attract replacements. These costs are at least partially offset if those who leave in DEP were poor matches for the Army with little chance of completing training and becoming productive soldiers.[1]

[1] There is some logic in suggesting, as we do at various points in this monograph, that early attrition in the DEP may be eliminating recruits who would have washed out later anyway. Further research on this particular question is warranted.

Figure 3.1 shows that DEP attrition has fallen substantially in recent cohorts. The loss rate has fallen from 19 percent of the FY1998 cohort to 14 percent in FY2001. The chart also shows the substantial difference in DEP attrition for high school seniors and others. The average loss rate for seniors is nearly twice that for nonseniors (27 percent versus 13 percent). In part, the difference between seniors and nonseniors reflects substantial differences in the average DEP length for the two groups. The average senior is in DEP for nearly eight months, as compared with only a two-month DEP for nonseniors. This long time in the DEP means that the new recruit has substantial time to change his or her mind about enlistment and renege on the commitment to join the Army.

The Army's success in reducing DEP in recent cohorts reflects an initiative to shorten DEP length for nonseniors. Between FY1995 and FY2001, the average DEP length for nonseniors has fallen from 3.4 months to 1.4 months. With shorter DEP, nonseniors have less chance for conflicts to develop and interfere with accession. A potential downside to the new lower DEP losses might be that some losses

Figure 3.1
Trends in DEP Attrition for Army Contracts



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for recruits who are not well suited for the Army might be pushed into the training bases. Individuals who would have dropped out of DEP with a longer DEP period may now continue into training and leave after imposing greater costs on the Army.

DEP length for seniors has varied little over the past eight cohorts. In FY1995, the average DEP length was 7.8 months for seniors, and this has fallen to 7.3 months by FY2001. Long DEP remains a hallmark of recruiting seniors, and high DEP attrition is strongly tied to long DEP.[2]

What Factors Affect DEP Attrition?

Recruit Characteristics

The probit regression results in Table 3.1 show that DEP attrition differs substantially for different types of recruits. The methodology simultaneously controls for a variety of factors that might affect DEP attrition, so the effect of each variable should be interpreted as the partial effect of the variable on DEP attrition (holding constant other recruit characteristics, features of the enlistment contract, recruiting environment, and recruiter characteristics).

Figure 3.2 shows the effects of gender, race/ethnicity, and education group on DEP attrition while holding constant other factors at their overall means. The DEP loss rate for women is about 19 percent as compared with about 14 percent for similar men. The loss rate for white non-Hispanics is about 15 percent, as compared with rates of 12, 13, and 14 percent for Asian, Hispanic, and African American

[2] The Army has in the past paid "quick-ship" bonuses to move recruits more quickly into the training base. While the primary intent of these bonuses was to fill openings in the training base (and thus improve capacity utilization), a secondary effect might be to reduce DEP attrition by shortening DEP time. Recruits who are available for quick-ship are likely to have relatively short DEP lengths (i.e., seniors are in school and not available to ship early), so the possible reduction in DEP attrition from quick-ship bonuses might be small. Whether or not such bonuses improve the chances of overall first-term success would be a useful question for further research.

Table 3.1
Regression Results for Factors Affecting DEP Attrition

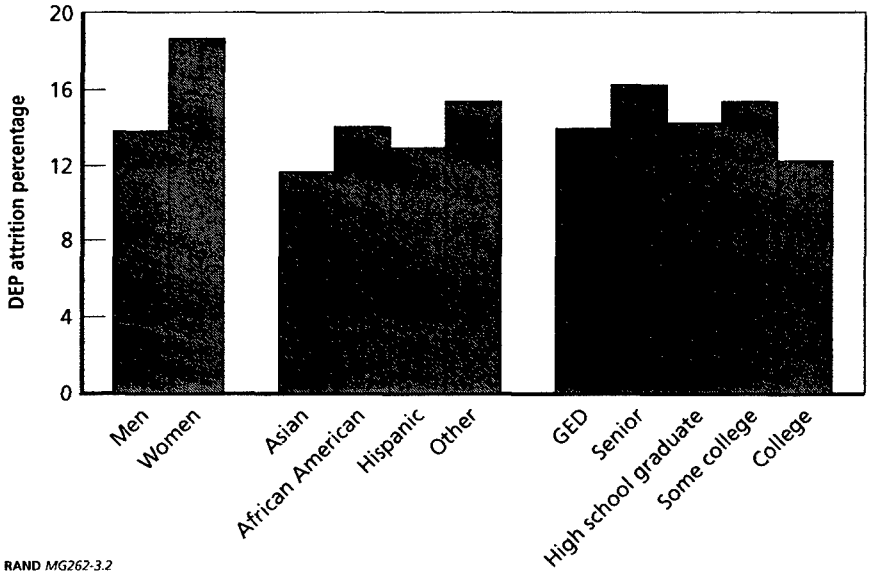
Variable	Coefficient	Standard Error	Effect	Means
Recruit characteristics				
Female	0.2019*	0.0055	0.0492	0.2140
African American	–0.0586*	0.0065	–0.0132	0.2281
Hispanic	–0.1147*	0.0091	–0.0251	0.0966
Asian	–0.1756*	0.0174	–0.0368	0.0223
Married with no children	–0.3838*	0.0129	–0.0726	0.0468
Married with children	–0.2824*	0.0107	–0.0568	0.0706
Single with children	–0.0748*	0.0162	–0.0165	0.0220
Age at time of contract	0.0194*	0.0010	0.0045	20.3102
Overweight	–0.1065*	0.0048	–0.0241	0.3675
GED	–0.0129	0.0090	–0.0030	0.0953
Senior at time of contract	0.0864*	0.0077	0.0202	0.3048
Some college	0.0538*	0.0121	0.0127	0.0405
College degree	–0.0874*	0.0160	–0.0192	0.0264
Trigonometry	–0.0308*	0.0095	–0.0071	0.4910
Geometry	–0.0007	0.0090	–0.0002	0.4394
AFQT	0.0011*	0.0002	0.0003	58.4425
Unemployment at contract	–0.0089*	0.0021	–0.0021	5.3076
Unemployment at accession	–0.0004	0.0020	–0.0001	5.2967
Features of enlistment contract				
Army College Fund	–0.1177*	0.0068	–0.0260	0.1758
No bonus	0.2601*	0.0119	0.0550	0.7906
Bonus amount (in thousands)	–0.0365*	0.0015	–0.0084	1.4460
Two-year term	0.0629*	0.0121	0.0149	0.0349
Three-year term	–0.0553*	0.0053	–0.0126	0.3848
Five-year term	–0.0601*	0.0092	–0.0134	0.0670
Six-year term	–0.0618*	0.0095	–0.0138	0.0680
Months in DEP	0.0774*	0.0009	0.0178	3.8306
Recruiting environment				
Contract in last 5 days of month	0.0664*	0.0060	0.0155	0.2819
Contract on last day of month	0.0391*	0.0084	0.0091	0.1136
Station/battalion met mission	–0.0282*	0.0052	–0.0064	0.3257
First contract for recruiter	–0.0554*	0.0137	–0.0124	0.0466
Only contract for recruiter	0.0369	0.0424	0.0086	0.0157
Recruiter characteristics				
Assignment in home state	–0.0033	0.0060	–0.0008	0.2311
College degree	–0.0011	0.0169	–0.0003	0.0216
Some college	–0.0352*	0.0120	–0.0080	0.0515
GED	0.0025	0.0265	0.0006	0.0333
Female	–0.0377*	0.0109	–0.0085	0.0607
African American	0.0392*	0.0065	0.0091	0.3254
Hispanic	0.0136	0.0119	0.0031	0.0623
Asian	–0.0038	0.0284	–0.0009	0.0115
Married	–0.0100	0.0083	–0.0023	0.8085
Divorced	0.0086	0.0140	0.0020	0.0481

Table 3.1 (continued)

Variable	Coefficient	Standard Error	Effect	Means
AFQT	–0.0003	0.0001	–0.0001	56.6181
Age	–0.0007	0.0008	–0.0002	29.5590
Recruiting experience	0.0010*	0.0002	0.0002	16.3445
Fiscal year of contract				
1996	0.0107	0.0086	0.0025	0.1487
1997	0.0498*	0.0094	0.0116	0.1512
1998	0.1024*	0.0098	0.0244	0.1374
1999	–0.0332*	0.0102	–0.0075	0.1283
2000	0.0311*	0.0104	0.0072	0.1482
2001	0.0153	0.0116	0.0035	0.1500
Intercept	–1.8234*	0.0379		

* Significantly different from zero at the 5 percent confidence level.

Figure 3.2
Differences in DEP Attrition by Gender, Race/Ethnicity, and Education Level



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recruits. The attrition rate for high school seniors is about two percentage points higher than for high school diploma graduates, even adjusting for differences in the DEP time of the two groups. Appar-

ently, seniors are more impulsive about joining the Army than are out-of-school recruits and more likely to back out of their commitment.

Married recruits seem much less likely to change their mind about enlistment and drop out of DEP than single recruits. About 16 percent of single recruits without children leave during DEP, as compared with 10 and 8 percent of recruits who are married with and without children, respectively. The loss rate for single parents is about 14 percent.

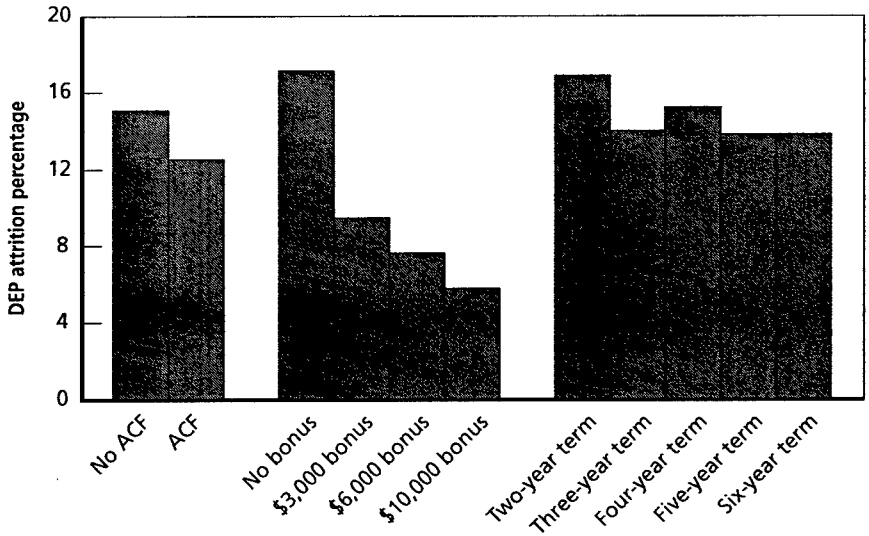
Most other recruit factors have a small effect on DEP loss rates. Age at entry is statistically significant, but a two-year increment in recruit age only increases the probability of a DEP loss by one percentage point. The aptitude variables have little effect on DEP loss. Recruits with a background in trigonometry (i.e., who have taken the course in high school) have loss rates nearly a point lower than do other recruits. Geometry background has no effect on DEP losses. AFQT is positively related to DEP attrition, but a 10 percentage point increase in recruit AFQT would only reduce DEP attrition by 0.3 percentage points. All other things being equal, overweight recruits have DEP loss rates two percentage points lower than otherwise comparable recruits who are not overweight. Higher unemployment rates are linked to lower loss rates, but this effect is also small.

Features of Enlistment Contract

Figure 3.3 summarizes the effects of ACF, bonuses, and term length on DEP attrition from the regression results. The loss rates are 2.5 percentage points lower for recruits with ACF than for those without. DEP attrition is about 17 percent for recruits who do not receive a bonus as compared with rates from nine to six percentage points for recruits who receive bonuses in the range of $3,000 to $10,000.

In contrast with ACF and bonuses, DEP loss rates vary little across term length. The loss rate for four-year term recruits is about 15 percent. The DEP attrition rate is about 1.5 percentage points higher for two-year term recruits and 1.5 percentage points lower for

Figure 3.3
Differences in DEP Attrition Enlistment Incentive Programs



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three-, five-, and six-year term recruits.[3] Only 3 percent of recruits entered the Army with a two-year contract, however, so there is little difference in DEP attrition for the three- and four-year terms that constitute 82 percent of all non-prior-service enlistment contracts.

DEP length has a large positive effect on DEP attrition. Each extra month that a recruit spends in DEP increases the chances of DEP attrition by 1.8 percentage points. Holding constant other factors, the two-month reduction in average DEP length for nonseniors between FY1995 and FY2001 should translate into a 3.6 percentage point decline in DEP attrition for nonseniors over this period. Since

[3] The underlying reasons for why term length affects DEP attrition are unclear. First, term length might be a proxy for commitment to the Army. This interpretation is consistent with the high DEP loss rates for recruits with two-year enlistments and the low rates for recruits with five- and six-year enlistments. Second, term length is generally linked to training times in particular occupations, however, so two-year enlistments are generally in jobs that have short training times (often "low tech"), and five- and six-year enlistments are for jobs with long training times. The long-term training may have a disproportionate civilian sector return, so recruits in those jobs are less likely to have second thoughts.

about 70 percent of recruits are nonseniors over this period, the shorter DEP length translated into a 2.5 percentage point decline in DEP attrition over the eight years.

Recruiting Environment

The results in Table 3.1 show that recruiting station issues at the end of the recruiting month affect DEP attrition. After controlling for recruit characteristics, the time of the month has some effect on how likely recruits are to complete DEP and go on active duty. Recruits who enter in the last five days of a recruiting month have DEP attrition rates 1.5 percentage points higher than for comparable recruits entering earlier in the month. Recruits who enter on the last day of the recruiting month have loss rates nearly 2.5 percentage points higher than for those entering before the last week of the recruiting month. These results suggest that the business pressures to round up recruits at the end of the month are having negative effects for the Army. The end-of-the-month rush may be pushing through prospects who are poorer risks than the average recruit (perhaps recruits with less motivation or more potential attitude problems). Alternatively, comparable recruits may show up at the end of the month, but these recruits might get less mentoring and attention than do recruits who show up earlier in the recruiting month.[4]

DEP losses do not vary much by recruiting station success. The results show that DEP losses are about 0.6 percentage points lower at stations that make mission than at stations that don't.

Recruiter status has some bearing on whether a prospect will successfully complete DEP. New recruiters appear to be more diligent in managing the DEP of their first contract than for subsequent enlistments. The results show that the DEP attrition rate for first con-

[4] The Army recently changed its timing of Recruit Ship Months (RSM) from end of month to mid-month. The change was designed to reduce the end-of-the-month surge of recruits from all four services at the Military Entrants Processing Stations. After the change, the Army's recruiting month ends at mid-month and the recruiting month for other service branches corresponds to the end of the calendar month. Although this accounting change has no bearing on our results, those trying to replicate them should keep this timing change in mind.

tracts is 1.2 percentage points lower than for contracts with experienced recruiters. The other indicator of recruiter status is whether the contract was the only contract for the recruiter. This variable is insignificantly different from zero, indicating that these recruits are as likely as others to complete DEP.

Recruiter Characteristics

The results show that recruiter characteristics have little effect on DEP attrition. We had thought that recruits might identify with some recruiters better than others and that this factor might help recruiters to shepherd recruits through DEP. Younger recruiters or recruiters who recruit in their home state are neither more nor less successful than other recruiters in successfully shepherding recruits through DEP. Single recruiters are not more successful than married or divorced recruiters in managing DEP. Recruiter AFQT has no effect on whether their recruits are likely to complete training. Recruiter education does not matter between most categories, but recruiters with some college do have DEP attrition rates about one percentage point lower than other recruiters.

A few recruiter characteristics do have a statistically significant effect on DEP losses. The average loss rate for a recruit with a female recruiter is about one percentage point lower than for a similar recruit with a male recruiter. African American recruiters have average DEP loss rates one percentage point higher than those of their white non-Hispanic counterparts.

Recruiter experience has a small positive effect on the DEP attrition. The results indicate that a twelve-month increment in recruiter experience is associated with only a quarter of a percentage point increase in the probability of DEP attrition.

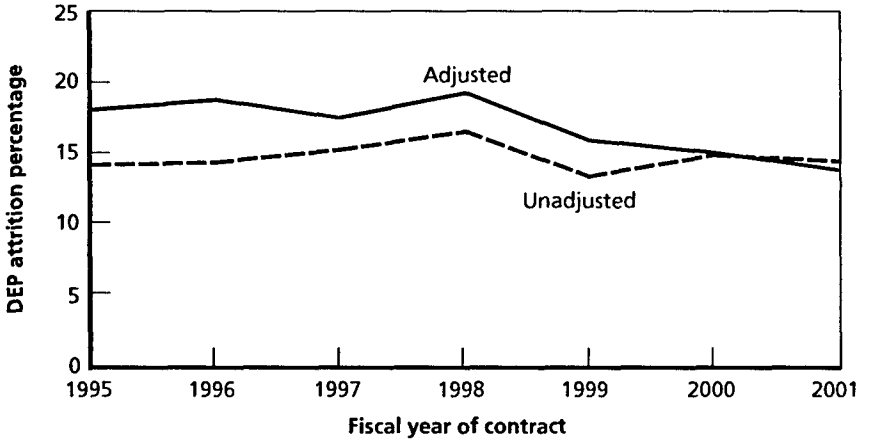
The weak link between recruiter characteristics and DEP losses may reflect weak incentives for recruiters to reduce DEP attrition. The current recruiter incentive system debits a recruiter for a DEP loss by increasing the recruiter's contract goal by one contract in the current month. The evidence seems to suggest that recruiters find it easier to attract a new recruit than to shepherd a dissatisfied recruit through DEP.

Overall Trend

While the overall trend in DEP attrition is downward, the trend is largely driven by the shorter DEP time for nonseniors. The DEP attrition model shows what the trend would be while holding constant other factors. For example, an important gauge of whether the DEP loss rates have improved would be whether we would expect recruits with identical characteristics, features of their enlistment contract, recruiting environment, and recruiter characteristics to have higher or lower attrition in FY2001 than in FY1995.

Figure 3.4 shows that the adjusted trend in DEP attrition has improved little over the eight-year period. While the unadjusted rate has declined by 4.2 percentage points over this period, the adjusted rate actually rises by 0.4 percentage points. The Army has succeeded in driving down DEP losses by attracting more recruits who are willing to accept short DEP times. This has driven down the overall DEP attrition rate, but the Army is not any more successful than in the past in managing the loss rates for comparable recruits. The ultimate success of the shorter DEP times will depend on whether the short-DEP nonseniors successfully complete training.

Figure 3.4
Trends in DEP Attrition for Army Contracts



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Implications of DEP Results for the Army

Our results suggest that the Army could reduce DEP losses if it relied less on seniors and on recruiting seniors with long DEP times. Since seniors have ranged between 20 and 30 percent[5] of the contract pool, however, it is unlikely that the Army can substantially reduce senior recruiting without adding substantial recruiting costs to attract replacements. Alternatively, the DEP time for seniors could be reduced if the Army delayed recruiting in the senior market until the spring of graduation year. The problem with this strategy is that the potential recruits from the senior market might simply shift to other services or find other alternatives. The Navy also faces high DEP losses from seniors (Warner, Simon, and Payne, 2001), so the Army might solicit Navy cooperation in shortening the allowed DEP for seniors. The dilemma for the Army is that if it recruits seniors early, then the DEP loss rates will be high, but if it recruits seniors late in the spring, then the pool of potential applicants will be substantially smaller (especially if other services continue to recruit earlier in the senior year).

The Army should investigate whether greater emphasis on reducing DEP losses is cost-effective. If recruits with a marginal commitment leave the Army during DEP, then it may save the Army the costs of training soldiers who are likely to be underachievers or problems for drill sergeants in training or unit leaders on their first assignment. The evidence from earlier studies (Buddin, 1988) is that training attrition rates decline with time in DEP, so DEP losses may be siphoning off recruits with poor prospects of success in training. If this is the case, the shortened DEP time for nonseniors is imposing extra training costs on the Army as losses are pushed from DEP to BCT.

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[5] The Army has reduced the share of senior contracts to about 20 percent in recent cohorts (Piskator, 2004). This lower senior content should reduce overall DEP attrition somewhat.

CHAPTER FOUR

Fitness Training Participation

About 4 percent of recruits in recent years have been assigned to the fitness training unit (FTU) before beginning BCT. Individuals are assigned to FTU if they fail an initial fitness test that is administered at the reception station at each training base. The course is intended to prepare new recruits for the physical demands of BCT and reduce injuries during BCT. The initial focus of the test was push-ups, but it has been expanded to include sit-ups and a one-mile run. The fitness training regimen includes running, weight training, push-up and sit-up improvement, road marching, and stretching. In addition, recruits are given some military training on Army values and customs.

The screening process for FTU assignment has changed somewhat over time and from base to base (Held, 1999; Knapik, 2001). Recruits who improve their sit-up or push-up performance are sometimes sent directly to BCT without completing the three-week course, whereas those with running problems are generally kept in the FTU for the full three weeks. Women are required to do three push-ups to pass at Fort Jackson, but they are not required to do any push-ups at Fort Leonard Wood. In some cases, the entry criterion for the program has been the same as the exit criterion, but in other cases, the exit criterion has been higher. For example, at Fort Jackson in FY1999, men were sent to the FTU if they could not do 13 push-ups, and they were sent to BCT when they could do 18 push-ups. However, the male entry and pass criterion for the one-mile run is eight minutes and thirty seconds. The assignment to FTU has also varied with a recruit's military occupational specialty (MOS). At Fort

Leonard Wood, for example, some recruits are routinely assigned directly to BCT without passing the initial fitness screen, because FTU training would disrupt their scheduled participation in AIT. In MOSs with infrequent AIT class start dates, the three-week FTU assignment would disrupt the training schedule.

While fitness participation averages 4 percent, the rate varies considerably from year to year and from place to place. Figure 4.1 shows that the rate for the FY1997 cohort was only 1.4 percent, as compared with 7.9 percent in FY2001. This five-fold increase in fitness training suggests that the Army has dramatically varied the application of the program over time, i.e., it seems unlikely that the fitness level of new entrants would have fallen so sharply in just five years.

Figure 4.2 shows that the emphasis of the fitness program has varied from base to base. In some years, some bases had nearly no participants in FTU. At Fort Sill, FTU participation averaged only

Figure 4.1
Changes in Fitness Program Participation Over Time

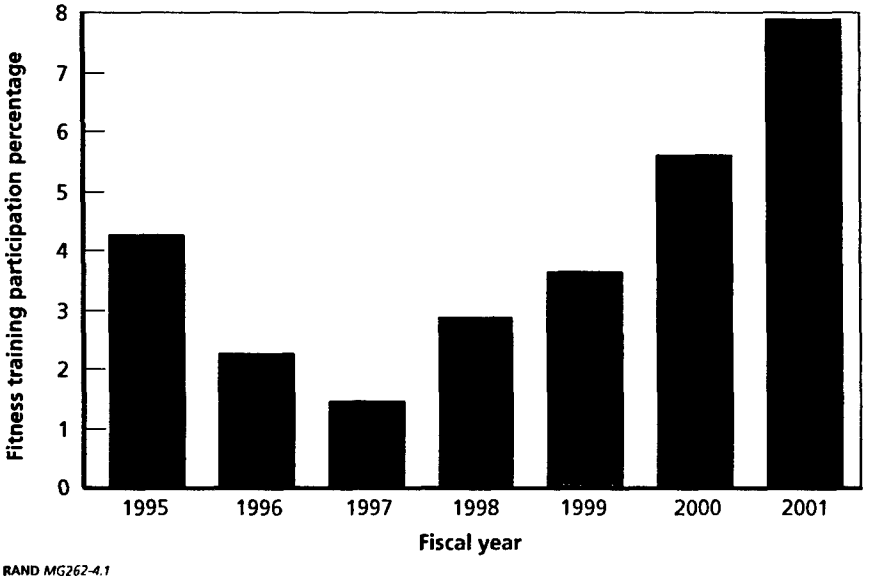

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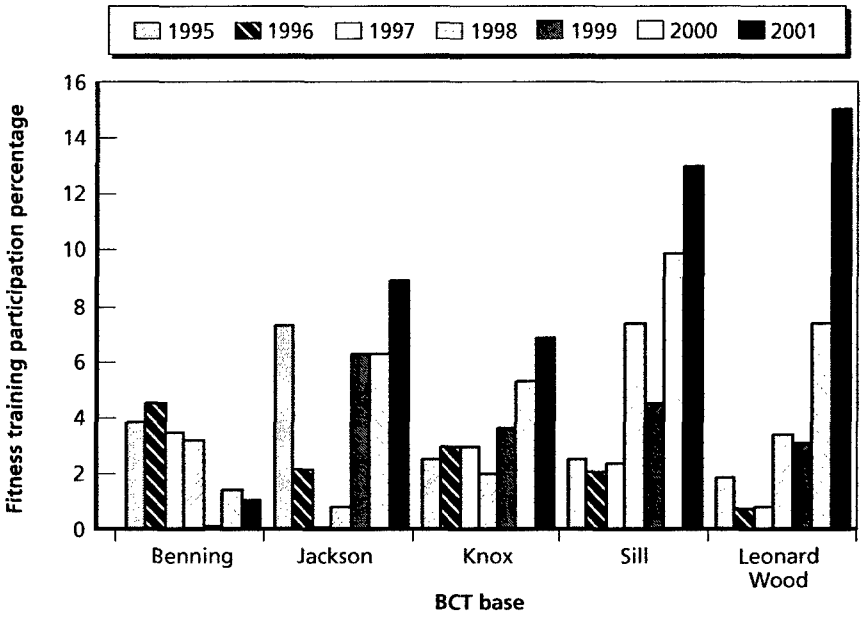
Figure 4.2
BCT Base Differences in Fitness Program Participation Over Time



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about 2 percent for FY1995 through FY1997, but the rate then rose to 13 percent in FY2001. At Fort Leonard Wood, only about 1 percent of recruits were sent to FTU before FY1998, but the rate has risen to 15 percent by FY2001.

The large swings in FTU participation across bases and over time suggest that comparable recruits are treated differently in different situations. We are unable to document the exact standard used at all bases at all times, but the standard has presumably been inconsistent both across bases and across time at each base.[1] These differences in the application of the fitness screen will allow us to assess how effective the FTU program is in successfully helping recruits through

[1] Some observers have suggested that the variations are attributable to differences in gender content across bases or over time. While we agree that these gender content differences exist, our methodology controls for them. Thus, our base-to-base differentials are differentials that persist *after* controlling for gender differences.

their initial training. We will compare the early attrition rates of FTU participants when the selection standards are strict (i.e., the FTU rate is high among a group of entrants) with the early attrition outcomes of similar recruits who pass through the reception station when the standards are more lax. These comparisons will provide some insight into the success of FTU training.

Fitness training participation is not a "bad" first-term outcome for the Army like attrition or a "good" outcome like early promotion or reenlistment. Nonetheless, the success of the Army in identifying recruits with fitness problems and mediating those problems will help the Army to hold down the requirements for new contracts and accessions.

What Factors Affect FTU Participation?

Recruit Characteristics

The regression results in Table 4.1 show that women and overweight recruits are much more likely to fail the initial fitness screen than are men or recruits who are not overweight.[2] Figure 4.3 shows that over 10 percent of women are sent to FTU as compared with only 2.5 percent of comparable men. Overweight recruits are nearly three times as likely to be assigned to fitness training as similar recruits who are not overweight. The FTU rates in the figure are conditional on all other factors in the model. For example, the high rates for women are conditional on other variables, including their weight status.

Fitness participation differs little among other recruit characteristics in the model. Fewer African American and Hispanic recruits attend FTU than their Asian and white non-Hispanic counterparts,

[2] Overweight recruits are assessed by an epidemiological standard that is based only on their height and weight. This approach is based on average relationships between body mass and body fat in studies of nationally representative population in various age groups. Some individuals who work out regularly may be in excellent physical condition but be classified overweight by the body mass index criteria because of excessive muscle mass.

Table 4.1
Regression Results for Factors Affecting Participation in Fitness Training

Variable	Coefficient	Standard Error	Effect	Means
Recruit characteristics				
Female	0.6895*	0.0106	0.0764	0.1917
African American	–0.1410*	0.0112	–0.0098	0.2241
Hispanic	–0.0679*	0.0146	–0.0048	0.0998
Asian	0.0593*	0.0266	0.0046	0.0233
Married with no children	–0.0388*	0.0185	–0.0028	0.0484
Married with children	–0.0506*	0.0158	–0.0036	0.0723
Single with children	–0.0687*	0.0268	–0.0048	0.0228
Age at time of contract	0.0159*	0.0016	0.0012	20.5866
Overweight	0.4515*	0.0083	0.0377	0.3812
GED	0.0761*	0.0145	0.0060	0.1030
Senior at time of contract	0.0327*	0.0142	0.0025	0.2766
Some college	0.0278	0.0190	0.0021	0.0428
College degree	–0.0873*	0.0407	–0.0060	0.0240
Trigonometry	–0.0091	0.0164	–0.0007	0.4936
Geometry	0.0012	0.0161	0.0001	0.4355
AFQT	–0.0013*	0.0003	–0.0001	58.3548
Unemployment at contract	–0.0085*	0.0035	–0.0006	5.3053
Unemployment at accession	0.0118*	0.0034	0.0009	5.3166
Features of enlistment contract				
Army College Fund	0.0190	0.0125	0.0014	0.1808
No bonus	0.0236	0.0152	0.0017	0.7458
Bonus amount (in thousands)	0.0076*	0.0016	0.0006	1.8284
Entry Paygrade E2	–0.1259*	0.0112	–0.0087	0.1818
Entry Paygrade E3	–0.1242*	0.0146	–0.0084	0.0944
Entry Paygrade E4–E6	–0.2648*	0.0391	–0.0157	0.0268
Two-year term	–0.0556*	0.0246	–0.0039	0.0373
Three-year term	–0.0174	0.0102	–0.0013	0.3746
Five-year term	0.0790*	0.0162	0.0063	0.0679
Six-year term	–0.0128	0.0164	–0.0009	0.0676
Months in DEP	–0.0055*	0.0019	–0.0004	3.4430
Recruiting environment				
Contract in last 5 days of month	0.0040	0.0110	0.0003	0.2711
Contract on last day of month	–0.0009	0.0157	–0.0001	0.1073
Station/battalion met mission	–0.0230*	0.0092	–0.0017	0.3274
First contract for recruiter	0.0243	0.0243	0.0018	0.0480
Only contract for recruiter	–0.0583	0.0618	–0.0041	0.0169
Recruiter characteristics				
Assignment in home state	0.0139	0.0093	0.0010	0.2310
College degree	0.0049	0.0277	0.0004	0.0217
Some college	–0.0068	0.0180	–0.0005	0.0518
GED	0.0048	0.0458	0.0004	0.0324
Female	0.0166	0.0163	0.0013	0.0608
African American	0.0332*	0.0101	0.0025	0.3235
Hispanic	0.0187	0.0176	0.0014	0.0630

Table 4.1 (continued)

Variable	Coefficient	Standard Error	Effect	Means
Asian	–0.0684	0.0387	–0.0048	0.0119
Married	0.0028	0.0128	0.0002	0.8095
Divorced	–0.0323	0.0217	–0.0023	0.0479
AFQT	0.0001	0.0002	0.0000	56.6157
Age	0.0021	0.0012	0.0002	29.6038
Recruiting experience	–0.0005	0.0003	0.0000	16.2605
Fiscal year of accession				
1996	–0.1386*	0.0180	–0.0094	0.1492
1997	–0.4231*	0.0205	–0.0242	0.1428
1998	–0.1216*	0.0188	–0.0084	0.1387
1999	–0.0942*	0.0189	–0.0066	0.1279
2000	0.0429*	0.0182	0.0033	0.1704
2001	0.2247*	0.0181	0.0191	0.1762
BCT base				
Fort Knox	0.1398*	0.0147	0.0114	0.1373
Fort Leonard Wood	–0.0205	0.0116	–0.0015	0.2155
Fort Sill	0.3057*	0.0128	0.0277	0.1490
Fort Benning	–0.0230	0.0142	–0.0017	0.1976
Intercept	–2.4027*	0.0610		

*Significantly different from zero at the 5 percent confidence level.

but the participation rates are only 1.5 percentage points apart. Differences in FTU rate are similarly small for marital/dependents status, education level, age, and AFQT.

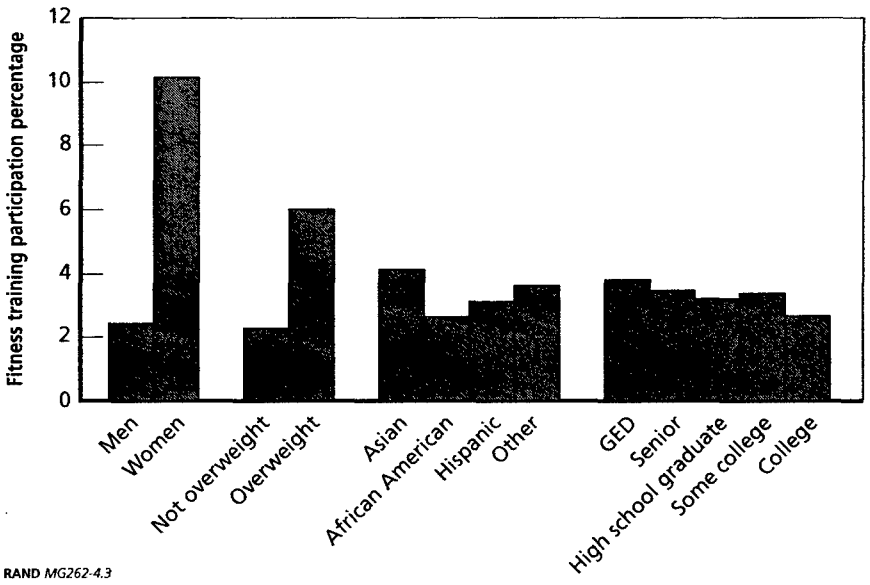
Features of Enlistment Contract, Recruiting Environment, and Recruiter Characteristics

The other groups of variables had little effect on fitness participation. We had not expected these variables to matter much, but we included them in the model for consistency with the regression specification for attrition.

BCT Base and Trends

Table 4.1 shows that there are substantial base and year effects on FTU participation, even after controlling for differences in the characteristics of recruits who are sent to different bases in different years.

Figure 4.3
Differences in Fitness Participation by Gender, Race/Ethnicity, and Education Level



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The rates at Forts Benning, Jackson, and Leonard Wood are about 2.8 percent for a representative Army recruit over these cohorts, as compared with 4.0 at Fort Knox and 5.7 at Fort Sill. The adjustment for individual characteristics is particularly important in this instance, since nearly all women train at either Fort Jackson or Fort Leonard Wood. These bases have relatively high nominal FTU rates because they train a disproportionate share of women, but Forts Knox and Sill have high FTU rates when adjusting for the composition of recruits sent to those bases.

The results for fiscal year of the contract reiterate that policies for assigning recruits to FTU have been in flux for recent years. Holding constant the quality of recruits sent to the training bases, the FTU rate ranged from 3.9 in FY1995 to 1.4 in FY1997 to 6.1 in FY2001 for a representative recruit over these cohorts.

Will Recent Upswing in Fitness Training Pay Off for the Army?

A key question is whether FTU participants are able to meet fitness standards and do well in training. We could compare the early attrition rates of FTU participants with all non-FTU participants. This type of comparison would be a poor reflection of the success of the program, however, since out-of-shape recruits have an inherent disadvantage in initial training where much of the emphasis is on physical conditioning. FTU participants might not be among the most fit recruits in BCT even after the course, but the hope is that they have improved sufficiently to be able to complete training.

A propensity score methodology is used for assessing the effectiveness of FTU training in getting recruits through their initial entry training. The "propensity score" approach compared the success of FTU participants with similar recruits who pass through the same training bases in the same months (Rosenbaum and Rubin, 1985; Angrist, 1997; Heckman, Ichimura, and Todd, 1997; Angrist, 1999; Dehejia and Wahba, 1999; Hirano, Imbens, and Ridder, 2000; Ichimura and Taber, 2001; Buddin and Kapur, 2002). Ideally, we would like to know whether an individual selected for FTU would have been more or less likely to complete training had they not been selected. This comparison could be readily made if FTU assignments were random across recruits at a given fitness level. Then, the effect of the program on attrition would be the difference in early attrition rate for the FTU group as compared with the group not selected for FTU.

The propensity score approach attempts to replicate an experimental design by comparing outcomes (attrition) for otherwise very similar individuals. Individuals are aligned based on their predicted probability of FTU assignment at each base in each month, and each FTU participant is matched with a nonparticipant with a similar probability of using FTU assignment. This matching of participants and nonparticipants balances the two groups on the observed factors that affect FTU assignment.

The results from the propensity score model suggest that FTU training is doing little to overcome the tendency of its participants to struggle in the Army. The overall probability for an FTU participant leaving during the first six months (early attrition) is 28 percent, as

compared with a rate of 16 percent for the group of matched controls that were not selected for FTU. We also reestimated the propensity score for each BCT base to assess whether FTU training was more successful at some places than indicated by the overall early attrition numbers. The results in Figure 4.4 show that FTU participants consistently have much higher attrition rates than do comparable other recruits at each base.[3]

One weakness of our approach is that we did not have access to actual fitness training test results administered at the reception stations. We are matching recruits on a range of descriptive characteristics, but we do not have a specific measure of fitness itself. The analysis could be improved if we had specific data on push-ups, sit-ups, and time for the one-mile run. This would provide a better match for each FTU participant and improve our measure of the "value added" by FTU training. Even given this limitation, however, the results show that recruits who arrive in poor physical condition fare very poorly in early attrition, since 28 percent of each FTU class will not successfully complete the first six months in the Army.

The attrition records provide little insight into the "causes" of losses, so it is difficult to sort out the reasons that FTU participants are doing poorly. About 80 percent of early losses are classified as "failure to meet procurement medical fitness standards" or "entry level performance and conduct." Figure 4.5 shows that fitness trainees are *less* prone to discharge for fitness reasons than are other comparable recruits. A larger share of fitness trainees has performance/conduct problems than does the matched sample of other recruits. This suggests that FTU participants may have other problems in addition to fitness when they join the Army.

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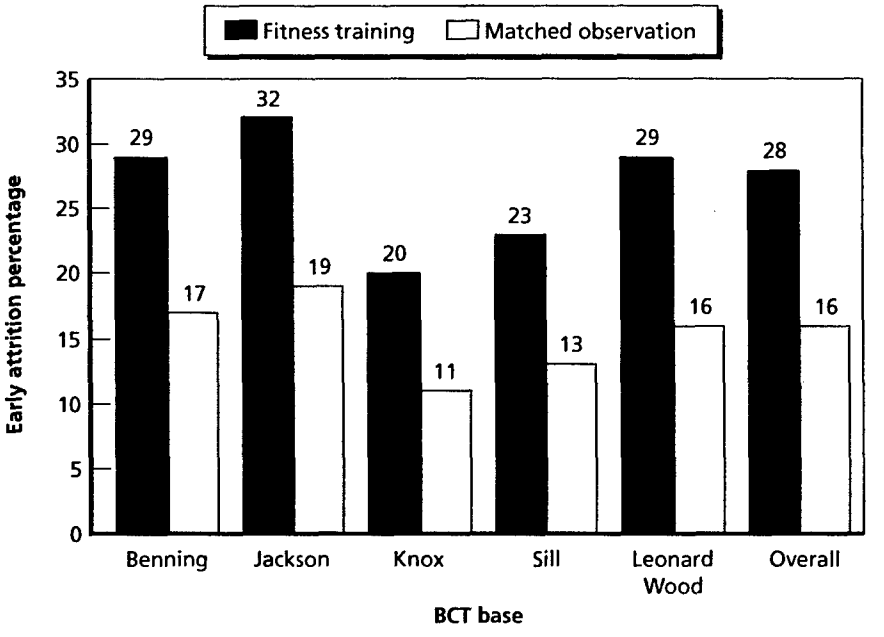
[3] Chervak (2004) finds that recruits who enter the Army in poor physical condition fare poorly in BCT. For example, she shows that men who initially score in the slowest quartile on the one-mile run are 1.9 times as likely to fail BCT as men who score in the fastest quartile. Women in the slowest quartile have loss rates 3.4 times those of women in the fastest quartile. These results are consistent with our finding that individuals who fail initial fitness screens and are assigned to FTU are unlikely to complete their first six months in the Army. Another source of attrition losses in the training base is recruits who enter the Army with pre-existing medical or physical impairments (see, for example, Army Audit Ageency, 2004).

Figure 4.4
Comparison of Early Attrition Rates for FTU Participants and a Matched Sample of Nonparticipants



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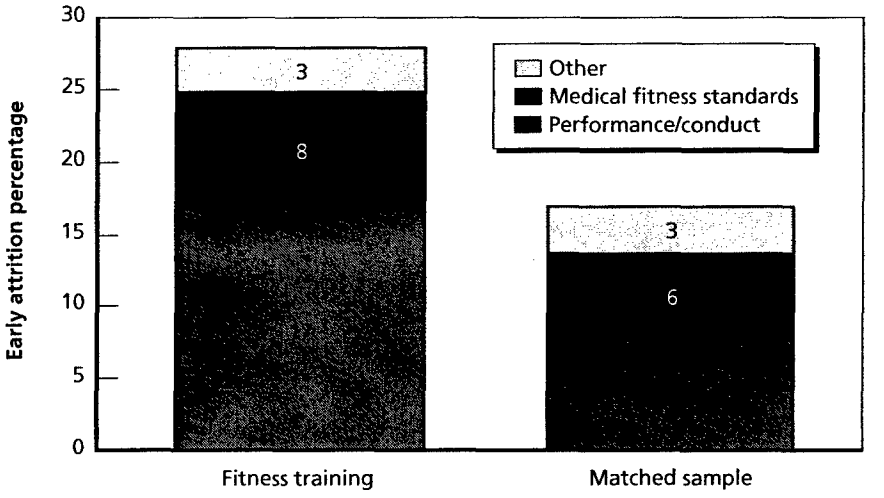
Why do the fitness trainees fare so poorly? The evidence is incomplete, but three (possibly interrelated) types of effects are possible.

- **Stigma effect.** Training officials may be more strict with FTU participants than with other recruits. Drill instructors may view these recruits as substandard for not arriving in proper condition and may be less tolerant of any infractions.
- **Frustration effect.** FTU participants may be discouraged by failing the initial fitness screen and have second thoughts about their decision to join the Army. Few recruits join the Army for calisthenics, and trainees targeted for FTU may become disillusioned with the Army.

Figure 4.5
Reasons for Early Attrition of FTU Participants and a Matched Sample of Nonparticipants



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- **Low-fitness effect.** It may be inherently impossible or impractical to condition some unfit recruits. If so, the Army should do a better job of screening out these individuals.

Implications of the Fitness Training Results for the Army

Recruits who fail the initial fitness screen are unlikely to complete their initial entry training. The overall loss rate among this group is 28 percent. About 25 percent of males and 33 percent of females who fail the fitness test will leave the Army during the first six months.

The Army should encourage recruits to arrive at BCT with some basic fitness proficiency. Recruits should be advised before accession about the importance of passing the initial fitness screen, what standards are expected, and steps that they could take in DEP to prepare for the physical aspects of BCT. Recruiters currently encourage re-

cruits in DEP to maintain their fitness levels, but these efforts don't seem to be universally successful.

In addition, the Army could investigate further fitness screening of recruits immediately before accession, so they arrive at the reception center in good physical condition. The Army is wasting considerable energy and resource by sending unfit recruits to the reception centers at BCT where their chances of success are low. In this regard, we note that the Army has recently been moving toward earlier identification of recruits who are at risk for fitness and encouraging them to improve their fitness levels before entry. Programs for accomplishing these goals should be carefully monitored for their effects.

Finally, the Army should implement a systematic evaluation of the efficacy of the FTUs. Ideally, pre-entry screening and fitness improvement efforts—as noted above—would reduce the need for such post-entry efforts. Since such an ideal is unlikely to be reached, the FTUs will still be needed to help reduce training losses. They should be evaluated on that basis: how well do they bring unfit recruits up to standard, how well do they rehabilitate injured recruits, and how well do the recruits in them fare generally, both during and after the program? A structured evaluation would test different fitness standards and different fitness programs. A control group would be sent directly to BCT from the reception center irrespective of their fitness level. Comparisons could be made between fitness and attrition rates of the control group and those of recruits selected for different fitness programs (including selection on alternative levels of fitness). This type of evaluation would provide clear guidance on how to address the problem of low initial fitness levels for some recruits. Again, we stress that there is considerable evidence that low fitness level (generally a correctible shortcoming) may be associated with other factors that make the recruit an attrition risk regardless of any success the Army may have in improving his or her fitness.

CHAPTER FIVE

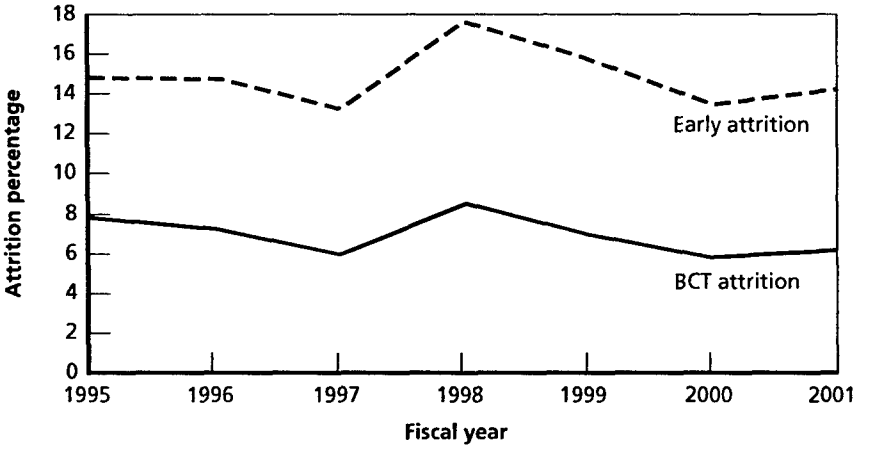
BCT Attrition

Many new recruits have trouble adjusting to the Army and are discharged during training. The average BCT attrition rate for FY1995 through FY2001 was 7 percent. The attrition rate for an entering cohort rises to 15 percent at the end of six months (early attrition) and to 36 percent at the end of thirty-six months (first-term attrition). These attrition losses mean that the Army must increase spending on recruiting and training to attract sufficient numbers of replacement personnel to fill first-term manning requirements. BCT and early attrition are costly to the Army because it recoups nothing on its recruiting and training expenses. The costs of indulging an unsuitable recruit are also considerable, however, since problem recruits may require extra monitoring and supervision in training as well as at their first assignment.

The largest attrition rate per unit of time occurs during BCT. BCT marks the initial adjustment to military life, and many recruits are unable or unwilling to make the adjustment. Figure 5.1 shows that BCT losses have ranged from nearly 9 percent to about 6 percent for the most recent cohort groups. The trends in early attrition largely reflect the trend in BCT losses.

Figure 5.2 shows that BCT attrition rates have varied considerably from base to base and at each base. The average attrition rate at Fort Jackson over these eight cohorts was 10 percent, as compared with only 4 percent at Fort Knox. Loss rates at Fort Jackson in FY1998 were twice those in FY2000 and FY2001. These large swings

Figure 5.1
Trends in BCT and Early Attrition



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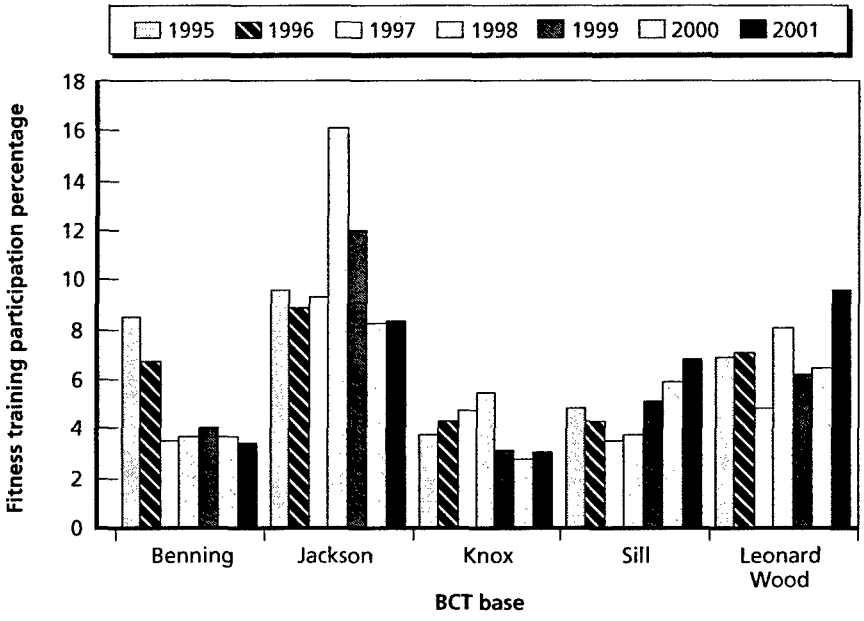
in attrition are also common at other bases. At Fort Benning, BCT losses were five percentage points lower in recent cohorts than in FY1995. At Fort Sill, the attrition rate rose three percentage points between FY1997 and FY2001.

In part, the attrition patterns in Figure 5.2 may be explained by differences in the underlying attrition propensities of the types of recruits assigned to each base in each year. For example, women historically have had high attrition rates, so this might explain why the two BCT sites that train women (Fort Jackson and Fort Leonard Wood) have higher loss rates than do the other BCT bases. In this chapter, we use the attrition model framework developed in Chapter Two to adjust for various factors that might affect BCT losses. After controlling for these factors, we assess whether attrition rates still vary across bases and over time. Persistent differences in attrition would suggest that the bases are varying the standards for passing a recruit in BCT, so a recruit arriving at a base at one time might have a very different probability of completing BCT from that of a similar recruit arriving at another time.

Figure 5.2
BCT Attrition Rates by Base and Over Time



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What Factors Affect BCT Attrition?

Recruit Characteristics

The effects of recruit characteristics, features of the enlistment contract, recruiting environment, and recruiter characteristics on BCT attrition are reported in Table 5.1.[1] BCT loss rates vary considerably with recruit characteristics. Figure 5.3 shows that BCT attrition rates for women are nearly twice those for comparable men. Loss rates are about 3.5 percentage points lower for minority recruits than for other

[1] In Appendix A, we explore whether the effects of demographic variables on BCT and early attrition vary from base to base. The results show some statistically significant differences, but the results are qualitatively similar across places.

Table 5.1
Regression Results for Factors Affecting BCT Training

Variable	Coefficient	Standard Error	Effect	Means
Recruit characteristics				
Female	0.3379*	0.0080	0.0469	0.1981
African American	–0.2860*	0.0090	–0.0301	0.2282
Hispanic	–0.3463*	0.0131	–0.0330	0.0983
Asian	–0.3364*	0.0259	–0.0308	0.0219
Married with no children	0.1205*	0.0139	0.0155	0.0487
Married with children	0.1481*	0.0122	0.0193	0.0722
Single with children	0.0746*	0.0207	0.0093	0.0227
Age at time of contract	0.0069*	0.0013	0.0008	20.5761
Overweight	0.0637*	0.0067	0.0076	0.3803
GED	0.2284*	0.0110	0.0311	0.1014
Senior at time of contract	–0.0564*	0.0111	–0.0065	0.2810
Some college	0.0565*	0.0165	0.0070	0.0408
College degree	–0.0607	0.0338	–0.0069	0.0244
Trigonometry	0.0491*	0.0140	0.0058	0.4868
Geometry	0.0544*	0.0137	0.0065	0.4435
AFQT	–0.0041*	0.0002	–0.0005	58.4769
Unemployment at contract	–0.0089*	0.0027	–0.0011	5.2890
Unemployment at accession	0.0043	0.0027	0.0005	5.2726
Features of enlistment contract				
Army College Fund	–0.0249*	0.0101	–0.0029	0.1807
No bonus	–0.0706*	0.0131	–0.0086	0.7587
Bonus amount (in thousands)	–0.0055*	0.0016	–0.0007	1.7034
Entry Paygrade E2	–0.0926*	0.0088	–0.0105	0.1823
Entry Paygrade E3	–0.1884*	0.0126	–0.0198	0.0925
Entry Paygrade E4–E6	–0.2452*	0.0323	–0.0242	0.0276
Two-year term	0.0490*	0.0191	0.0060	0.0361
Three-year term	0.0093	0.0080	0.0011	0.3666
Five-year term	0.0441*	0.0133	0.0054	0.0668
Six-year term	–0.0176	0.0129	–0.0021	0.0704
Months in DEP	–0.0003	0.0014	0.0000	3.4929
Recruiting environment				
Contract in last 5 days of month	–0.0108	0.0087	–0.0013	0.2744
Contract on last day of month	0.0334*	0.0123	0.0040	0.1092
Station/battalion met mission	–0.0049	0.0072	–0.0006	0.3245
First contract for recruiter	–0.0057	0.0194	–0.0007	0.0330
Only contract for recruiter	–0.0335	0.0527	–0.0039	0.0043
Recruiter characteristics				
Assignment in home state	0.0137	0.0074	0.0016	0.2397
College degree	0.0359	0.0215	0.0044	0.0227
Some college	0.0122	0.0142	0.0015	0.0538
GED	–0.0146	0.0402	–0.0017	0.0064
Female	–0.0011	0.0134	–0.0001	0.0634
African American	–0.0043	0.0080	–0.0005	0.3359
Hispanic	–0.0572*	0.0149	–0.0065	0.0625

Table 5.1 (continued)

Variable	Coefficient	Standard Error	Effect	Means
Asian	–0.0584	0.0332	–0.0066	0.0110
Married	0.0062	0.0102	0.0007	0.8278
Divorced	–0.0026	0.0172	–0.0003	0.0491
AFQT	–0.0001	0.0002	0.0000	56.6191
Age	–0.0021*	0.0009	–0.0002	29.5758
Recruiting experience	–0.0002	0.0003	0.0000	16.6718
Fiscal year of accession				
1996	–0.0538*	0.0143	–0.0062	0.1535
1997	–0.2258*	0.0149	–0.0238	0.1697
1998	0.0915*	0.0147	0.0114	0.1553
1999	–0.0548*	0.0153	–0.0063	0.1431
2000	–0.1738*	0.0159	–0.0187	0.1538
2001	–0.1465*	0.0160	–0.0160	0.1550
BCT base				
Fort Knox	–0.4287*	0.0126	–0.0394	0.1192
Fort Leonard Wood	–0.2139*	0.0086	–0.0230	0.2161
Fort Sill	–0.3115*	0.0114	–0.0308	0.1282
Fort Benning	–0.3631*	0.0102	–0.0366	0.2115
Intercept	–1.0186*	0.0496		

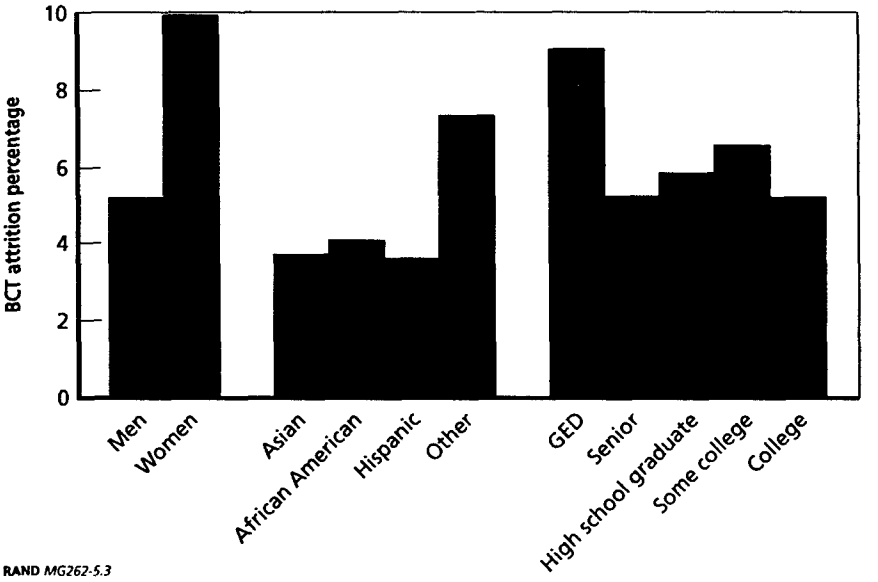
*Significantly different from zero at the 5 percent confidence level.

recruits. Recruits with GEDs fare poorly, with about 9 percent failing to complete BCT. About 56 percent of recruits are high school diploma graduates without any college, and the attrition rate for this group is 5.9 percent. Seniors comprise another 28 percent of entrants, and seniors have an overall attrition rate of 5.2 percent.

Single recruits with no children have attrition rates one to two percentage points lower than comparable recruits with a spouse or children. The greater success of single recruits in BCT largely offsets their higher DEP attrition rates, so the proportion of contracted recruits who complete DEP and BCT varies little with marriage/dependents status.

BCT focuses on physical conditioning, so overweight recruits might have greater difficulty at some tasks. The results indicate that overweight recruits have BCT loss rates about one percentage point higher than similar recruits who are not overweight.

Figure 5.3
Differences in BCT Attrition by Gender, Race/Ethnicity, and Education Level

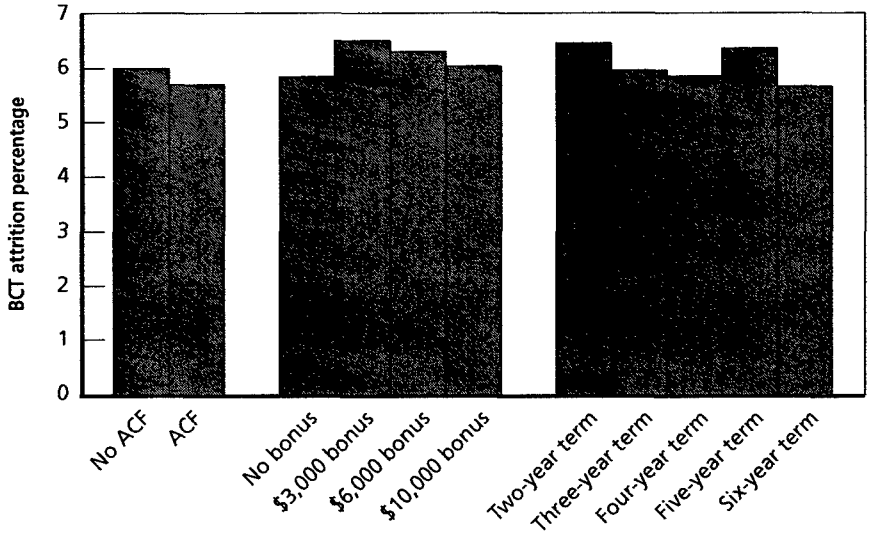


Several other recruit characteristics have small, but statistically significant, effects on BCT losses. AFQT is inversely related to BCT losses, but the results suggest that a recruit with an AFQT percentile score of 70 would have a BCT loss rate only one percentage point lower than a comparable recruit with an AFQT score of 50. The age effect on attrition is positive, but the results suggest that an 18-year-old recruit would have a BCT loss rate only 0.4 percentage points lower than that of a 23-year-old recruit.

Features of Enlistment Contract

Figure 5.4 shows that BCT attrition rates vary little with enlistment incentives or term length. About 85 percent of recruits have either a three- or four-year term, and the BCT rate for these two groups is 5.9 percentage points. The two- and five-year term recruits have loss rates that are about 0.5 percentage points higher than for three- and four-

Figure 5.4
Differences in BCT Attrition by Enlistment Incentive Programs



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year recruits. The rates for six-year recruits are not significantly different from those for three- and four-year recruits. Bonus recipients have attrition rates about one percentage point higher than for recruits receiving no bonus.

While most recruits enter the Army at the lowest paygrade of E1, some recruits enter at a higher rank due to civilian training or experience. The regression results show that accelerated pay is associated with lower attrition. The BCT loss rate for an E2, an E3, or a recruit who enters as an E4 or higher is 1, 2, and 2.5 percentage points lower than that of a comparable recruit who enters as an E1.

In earlier attrition studies (Buddin, 1984; Buddin, 1988), DEP length was positively related to attrition. The common view was that impulsive recruits with misgivings about the Army and long DEP times might leave during DEP. As a result, recruits with long DEP times who reach BCT might be even more committed to the Army than recruits who entered quickly after signing their contract. This

logic suggests that the shortened DEP time in recent cohorts for nonseniors (see Chapter Three) might lead to higher BCT attrition rates.

The results in Table 5.1 show that DEP length has no bearing at all on BCT attrition. Since DEP time does not affect BCT losses, the pressure to drive down DEP length for nonseniors has not had an adverse effect on the attrition rate of nonseniors in BCT.

Recruiting Environment

Recruiting environment did affect DEP attrition, but there is very little lingering effect of recruiting environment on BCT attrition. The coefficients for the variables for a contract in the last 5 days of the recruiting month, for whether the station met mission, and for the first or only contract by the recruiter are all insignificantly different from zero.

Recruits who sign their contracts on the last day of the recruiting month do have BCT attrition rates 0.4 percentage points higher than recruits who enlist on other days. This small effect is not compelling evidence that end-of-the-month pressure to attract recruits draws individuals who are poorly matched with the Army.

Recruiter Characteristics

Recruiter attributes have little bearing on how well recruits do in BCT. Recruiter age, education, recruiting experience, ethnicity, aptitude, and marital status have little or no effect on BCT attrition rates. Similarly, recruiters assigned in their home state are not any more successful in identifying prospects who are likely to pass this initial hurdle in the Army.

Trend and Base Effects

The BCT attrition rate varies substantially from year to year, even after controlling for recruit characteristics and other factors in the model. The results suggest that the probability of a comparable recruit failing in BCT rose from 4.5 percent in FY1997 to 8.5 percent in FY1998. In recent years, the quality-adjusted BCT loss rate falls from a peak in FY1998 to about 5 percent in the two most recent cohorts.

Large base differences in BCT are also significant after adjusting for other factors in the model. The adjusted attrition rate at Fort Jackson is 9 percent, as compared with rates of 6, 5, 4, and 4 at Forts Leonard Wood, Sill, Benning, and Knox, respectively.[2]

Cohort and Base Differences in BCT Losses

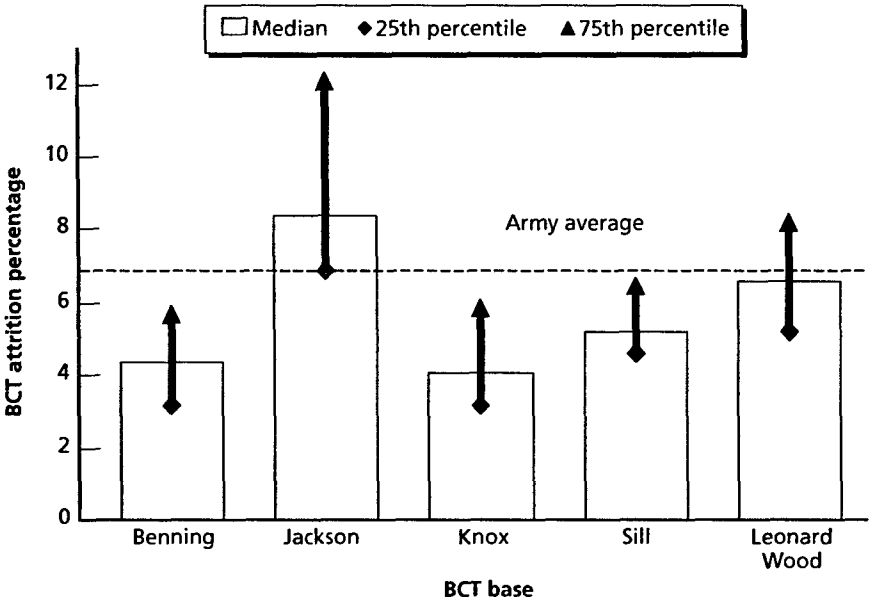
We further investigated the effects of cohort and base on BCT losses by reestimating the model in Table 5.1 with a more detailed specification. The model was estimated with a separate indicator variable for each month at each base over the seven-year period. This model allows us to explore more complex interactions between time and base. For example, are rates consistently high or low at a particular base? Do attrition rates vary much over time at a particular base?

Figure 5.5 shows that the chance of a representative recruit failing to complete BCT varies substantially across bases and at each base over time. The median rate at Fort Jackson is 8.4 percent, as compared with only 4.1 percent at Fort Knox. At each of the bases, the range of BCT loss rates is considerable. The difference between the attrition rate at the 75th percentile and the 25th percentile is five percentage points at Fort Jackson and nearly two percentage points for Fort Sill. While Fort Leonard Wood has a median attrition rate slightly below the Army average, its attrition rate varies from 8.2 percent at the 75th percentile to only 5.2 percent at the 25th percentile.

The large variance in BCT losses suggests that the policies and standards applied at the training bases have not been uniform. A

[2] Wardynski and Halford (1999) also show that entry-level attrition varies substantially by training base. They argue that recruits at Fort Jackson were much more likely to separate without counseling about staying in the Army. In addition, they find that Fort Jackson recruits who did separate tended to begin separation processing much more quickly than did problem recruits at other bases. This evidence is consistent with our evidence that the chances of separation vary substantially from base to base, because different policies and practices are employed at different training bases. We also show below that discharge rates can vary substantially from month to month at a given base.

Figure 5.5
Differences in BCT Attrition by Base and Over Time at Each Base



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comparable recruit arriving at Fort Jackson in some months would have a 12 percent chance of failing, as compared with only a 3.2 percent chance of failure at Fort Knox.

An important question for the Army is whether the high loss rates for some base/month groups are weeding out recruits who would have failed later anyway. For example, a strict BCT standard may preempt later problems by pressuring some marginal performers to improve and discharging those who do not meet the grade.

The efficacy of stricter BCT standards depends on the nature of BCT problems. Two competing hypotheses explain the types of problems that affect BCT losses.

- **Bad apple effect.** This philosophy suggests that some recruits are inherently unsuitable for the Army. If so, the Army should not waste extra resources on them, because they are unlikely to im-

prove and contribute. In addition, the problems of these low performers can degrade the performance of others who are frustrated that underachievement goes unattended.

- **Transition effect.** This philosophy argues that training problems may reflect temporary adjustment problems and not underlying conduct or performance issues. Mentoring and flexibility for struggling recruits may produce "good soldiers."

An important challenge for BCT officials is to structure their policies and practices to weed out the bad apples quickly and provide mentoring and some patience for recruits who are experiencing a difficult transition to the Army.

Downstream attrition will be an indication of whether recent swings in BCT are effectively dropping "bad apples" or recruits with transition problems. If high BCT losses are weeding out "bad apples," then the cohort survivors under strict BCT standards should have lower losses in AIT and at their first assignments. In contrast, if strict BCT policies filter out recruits with transitory problems, they will have little effect on AIT and post-training attrition.

We looked at downstream attrition by estimating models of early and first-term attrition rates, conditional on the successful completion of BCT. Each model included a variable for the BCT attrition rate of the base/month cohort, adjusted for the average characteristics of recruits entering between FY1995 and FY2001. This variable reflects the strictness of BCT policies and practices when the recruit was in BCT.

The results show that the BCT attrition rate of an entry cohort has little effect on subsequent attrition. The early attrition rate (i.e., from completion of BCT through the end of the first six months) of recruits who complete BCT is unaffected by the attrition rate of their BCT class. First-term attrition of BCT graduates is slightly reduced when the BCT standard is strict, but the magnitude of the effect is small. The conditional probability of a BCT graduate completing his or her first term when the BCT attrition rate of his or her class was 7 percent (the overall average) is 30.4 percent. If the pass rate for the

soldier's BCT class was 8 percent, then the expected probability of completing the first term is 30.2 percent.

The high BCT loss rates in some base/month cohorts of recent years thus appear to have done very little to reduce the downstream attrition of these cohorts. On the contrary, the high loss rates in BCT *may* be inappropriately screening out many recruits with good downstream potential.

Implications of BCT Results for the Army

The Army needs much better systems to track BCT progress and the underlying reasons for attrition losses. More objective measures of problems and progress in training are important for assessing the effectiveness of BCT policies and procedures. In addition, the Army needs a better link between measures of post-BCT progress and an assessment of BCT success. While BCT should have some explicit targets and goals, its ultimate objective is to assure some level of AIT and post-training proficiency. The Army needs to be careful that pressures for lowering BCT losses do not come at the expense of pushing problems forward to AIT and the first assignment.

The Army should consider innovative programs to help at-risk recruits. With 80,000 soldiers passing through BCT each year, the Army could readily test new approaches for a few months at some base or for some group of recruits and evaluate whether the program reduced BCT or downstream losses. With new recruits arriving at bases regularly, the opportunities for careful assessments are substantial. The potential savings from identifying effective programs would be large.

CHAPTER SIX

Early Attrition

Background

The early attrition rate averaged about 15 percent for the FY1995 through FY2001 cohorts. The rate has ranged from a low of 13.4 percent for the FY1997 cohort to a high of 17.7 percent for the FY1998 cohort. As in the earlier chapters, this chapter explores whether these trends in early attrition are largely explained by changes in the composition of successive cohorts or whether the swings remain after adjusting for recruit characteristics and other factors in our attrition model.

This chapter also explores whether the pattern of factors affecting BCT losses persists in early attrition. Some groups of recruits might be ill-suited to the Army, but their problems might be concentrated at one phase of the term and not continue into other phases. For example, overweight recruits might struggle in BCT, where the emphasis is on physical fitness, but those survivors of BCT fitness standards might do fine in AIT, where the emphasis shifts more to learning job skills. Other factors, like AFQT, might be more important for AIT training than for BCT training.

Finally, we will look at the cumulative effects of attracting a different mix of recruits. The analysis will look at how many new recruits are likely to successfully complete DEP, BCT, and the first six months of active duty.

What Factors Affect Early Attrition?

Recruit Characteristics

Figure 6.1 shows the pattern of early attrition losses by several demographic factors (the regression results are in Table 6.1). The gap between the attrition rates of women and men has risen from five percentage points at the end of BCT to eleven percentage points at the end of six months. The problems that women have in adapting to the Army persist beyond BCT and into AIT.

Table 6.1
Regression Results for Factors Affecting Early Training

Variable	Coefficient	Standard Error	Effect	Means
Recruit characteristics				
Female	0.4185*	0.0068	0.1052	0.1981
African American	−0.2911*	0.0071	−0.0589	0.2282
Hispanic	−0.3334*	0.0099	−0.0633	0.0983
Asian	−0.3383*	0.0196	−0.0621	0.0219
Married with no children	0.1041*	0.0114	0.0242	0.0487
Married with children	0.1227*	0.0100	0.0287	0.0722
Single with children	0.0657*	0.0167	0.0150	0.0227
Age at time of contract	0.0054*	0.0011	0.0012	20.5761
Overweight	0.0942*	0.0053	0.0211	0.3803
GED	0.2626*	0.0089	0.0646	0.1014
Senior at time of contract	−0.0657*	0.0088	−0.0143	0.2810
Some college	0.0632*	0.0132	0.0144	0.0408
College degree	−0.0438	0.0273	−0.0095	0.0244
Trigonometry	0.0600*	0.0111	0.0133	0.4868
Geometry	0.0636*	0.0109	0.0141	0.4435
AFQT	−0.0045*	0.0002	−0.0010	58.4769
Unemployment at contract	−0.0054*	0.0022	−0.0012	5.2890
Unemployment at accession	−0.0001	0.0022	0.0000	5.2726
Features of enlistment contract				
Army College Fund	−0.0321*	0.0080	−0.0070	0.1807
No bonus	−0.0379*	0.0103	−0.0085	0.7587
Bonus amount (in thousands)	−0.0009	0.0012	−0.0002	1.7034
Entry Paygrade E2	−0.0958*	0.0069	−0.0205	0.1823
Entry Paygrade E3	−0.2004*	0.0099	−0.0404	0.0925
Entry Paygrade E4–E6	−0.2872*	0.0261	−0.0544	0.0276
Two-year term	0.0180	0.0152	0.0040	0.0361
Three-year term	0.0231*	0.0063	0.0051	0.3666
Five-year term	0.0121	0.0109	0.0027	0.0668
Six-year term	−0.0382*	0.0106	−0.0083	0.0704
Months in DEP	−0.0056*	0.0011	−0.0012	3.4929

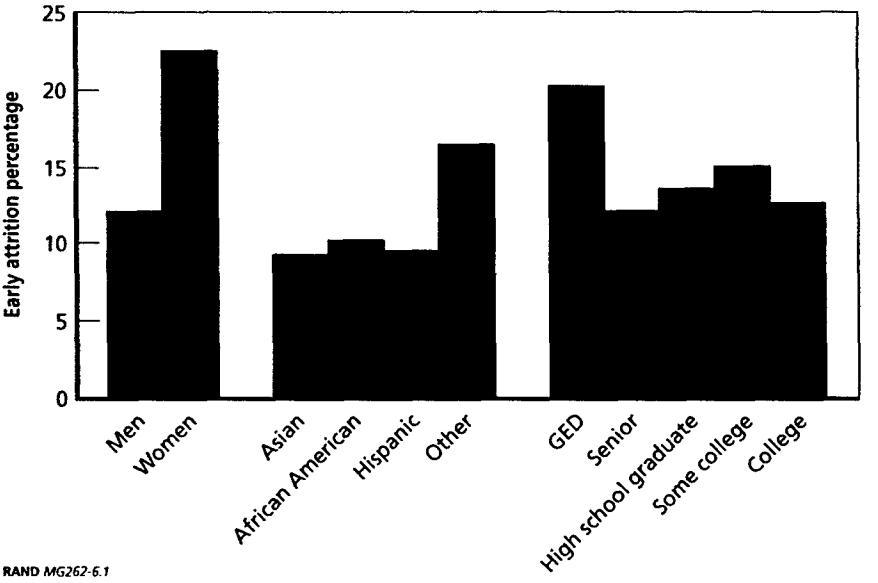
Table 6.1 (continued)

Variable	Coefficient	Standard Error	Effect	Means
Recruiting environment				
Contract in last 5 days of month	–0.0148*	0.0069	–0.0033	0.2744
Contract on last day of month	0.0144	0.0098	0.0032	0.1092
Station/battalion met mission	–0.0214*	0.0058	–0.0047	0.3245
First contract for recruiter	0.0047	0.0155	0.0010	0.0330
Only contract for recruiter	0.0308	0.0408	0.0069	0.0043
Recruiter characteristics				
Assignment in home state	0.0094	0.0059	0.0021	0.2397
College degree	–0.0102	0.0174	–0.0022	0.0227
Some college	0.0025	0.0113	0.0006	0.0538
GED	0.0111	0.0314	0.0025	0.0064
Female	–0.0066	0.0107	–0.0015	0.0634
African American	0.0141*	0.0064	0.0031	0.3359
Hispanic	–0.0315*	0.0116	–0.0069	0.0625
Asian	–0.0481	0.0256	–0.0104	0.0110
Married	0.0106	0.0081	0.0023	0.8278
Divorced	–0.0052	0.0137	–0.0011	0.0491
AFQT	0.0000	0.0001	0.0000	56.6191
Age	–0.0005	0.0007	–0.0001	29.5758
Recruiting experience	–0.0004	0.0002	–0.0001	16.6718
Fiscal year of accession				
1996	0.0444*	0.0118	0.0100	0.1535
1997	–0.1073*	0.0122	–0.0228	0.1697
1998	0.1720*	0.0122	0.0405	0.1553
1999	0.0557*	0.0125	0.0126	0.1431
2000	–0.0564*	0.0129	–0.0122	0.1538
2001	–0.0599*	0.0130	–0.0129	0.1550
BCT base				
Fort Knox	–0.1634*	0.0095	–0.0337	0.1192
Fort Leonard Wood	–0.0854*	0.0071	–0.0184	0.2161
Fort Sill	–0.1128*	0.0090	–0.0238	0.1282
Fort Benning	–0.0059	0.0078	–0.0013	0.2115
Intercept	–0.8452*	0.0397		

*Significantly different from zero at the 5 percent confidence level.

The results for race/ethnicity and education level show that differences in the chances of success for these groups also persist into AIT. At six months, minority recruits have attrition rates six or seven percentage points lower than white non-Hispanics, as compared with a gap of three to four percentage points at BCT. Soldiers with GEDs

Figure 6.1
Differences in Early Attrition by Gender, Race/Ethnicity, and Education Level



are having more problems in AIT than recruits with other education credentials. The early attrition rate for GEDs is about 20 percent, as compared with 14 percent for high school diploma graduates and 12 percent for seniors. The gap between GED and high school graduates has doubled between BCT and early attrition.

The results show that married recruits and parents (either single or married) have early attrition rates two to three percentage points higher than similar single recruits. Family issues and time away from home for training may take a toll on many of these young recruits. Families do not accompany recruits to training, and the strain of family separation is difficult for many soldiers.

Age, weight, aptitude, and employment prospects play some role in early attrition. Older recruits have slightly higher early attrition than others. Overweight recruits have early attrition rates about two percentage points higher than recruits who are not overweight (this difference was less than one percentage point in BCT). More high

school math and higher AFQT are associated with lower early attrition. Early attrition is inversely related to unemployment rates in the recruit's home area. This indicates that recruits who may have been motivated to join the Army by tough economic conditions are more motivated to succeed in training than are recruits who joined for other reasons.

Features of the Enlistment Contract

Figure 6.2 shows that early attrition rates differ little with enlistment incentive or term length. This pattern largely mirrors that of Figure 5.4, which showed little pattern in these factors for BCT.

Fast-track recruits who enter at an accelerated paygrade have lower early attrition rates than do similar other recruits. The results show that the lower attrition rates for these groups in BCT persists into AIT. The attrition rates of recruits who enter as E2s, E3s, and E4s or higher have early attrition rates that are two, four, and five percentage points lower, respectively, than for recruits with similar other characteristics. The accelerated pay program is apparently attracting recruits who are well suited to the Army in the sense that they have fewer performance and conduct problems in the early stages of their enlistment terms.

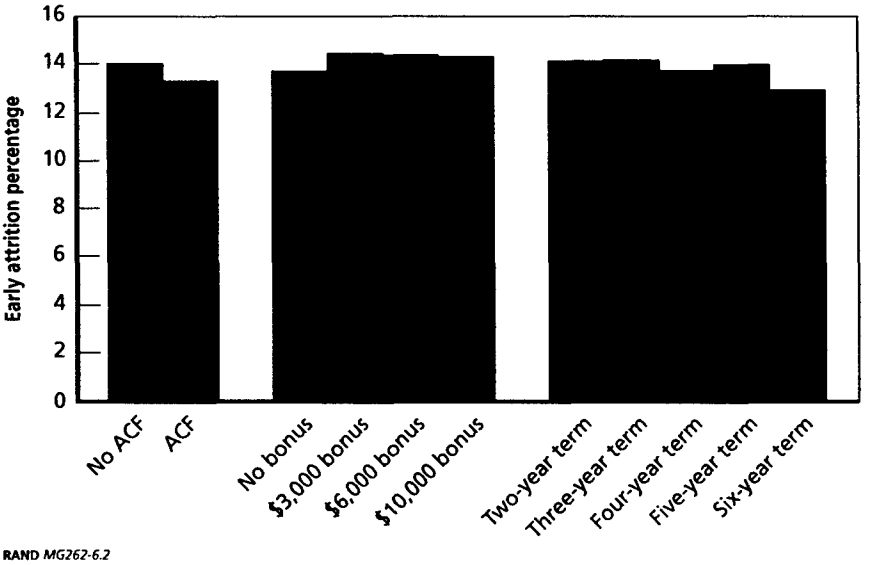
DEP time has little effect on early attrition. An extra four-month stay in DEP reduces early attrition rate by only 0.5 percentage points.

Recruiting Environment

Early attrition rates differ little with the recruiting environment when the recruit joined the Army. Early attrition rates are 0.3 percentage points lower for recruits who enlisted in the last five days of the recruiting month than for other recruits. Recruits from stations that met the monthly mission are about 0.5 percentage points less likely to complete the first six months than are similar recruits from stations that did not meet mission.

Anecdotal evidence from recruiters suggested that recruits would be pressured to enlist at the end of a month if the enlistment would

Figure 6.2
Differences in Early Attrition by Enlistment Incentive Programs



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help the station meet mission. If so, then these "pressured" recruits might subsequently have second thoughts about the Army and wash out. Recruiting pressures may lead to some bad matches for the Army, but these individuals seem to wash out in DEP. The attrition profile of recruits who reach active duty is largely unaffected by recruiting conditions when they joined. Some types of recruits are more prone to complete training than others, but it does not seem to matter how we get them to training.

Recruiter Characteristics

The likelihood of a recruit leaving in the first six months is not tied to attributes of the individual's recruiter. The early attrition rates for recruits with African American recruiters are 0.3 percentage points higher than for white non-Hispanic recruiters, while the rates for Hispanic recruiters are 0.7 percentage points lower than for white non-Hispanics. Recruiter age, education, recruiting experience, apti-

tude, marital status, and home state assignment all have an insignificant effect on early attrition rates.

The unimportance of recruiter characteristics in predicting attrition suggests that it may be quite difficult to anticipate whether a recruit will be a good fit for the Army. The strong effects of individual characteristics show that some types of recruits do much better than others, but recruiters do not seem to be able to distinguish other characteristics that will make recruits likely to stay in the Army.

A more cynical interpretation of the weak effects of recruiter characteristics on early attrition is that it is hard for the current system to give recruiters any significant incentive to worry about whether recruits will successfully complete training.[1] Perhaps smarter or more experienced recruiters can recognize that some recruits have unrealistic expectations and are prone to become disillusioned with the Army, but this ability—if it is present—does not seem to be helping them bring in recruits who are better matched.

Cohort and BCT Effects

The results show that attrition varies substantially from cohort to cohort even after adjusting for recruit background and other factors that affect early attrition. The adjusted early attrition rates range from a low of 11.5 in FY1997 to a high of 17.8 for the FY1998 cohort. In the most recent cohorts, the rate has been about 12.5 percent. This range of early attrition rates after adjusting for other factors suggests that Army attrition standards and practices have not been consistent over these cohorts.

BCT base has some effect on early attrition, but the effect is mainly confined to the BCT portion of the first six months. As we saw in Chapter Five, higher BCT loss rates have no bearing on how well recruits do in the early portion of the term after BCT.

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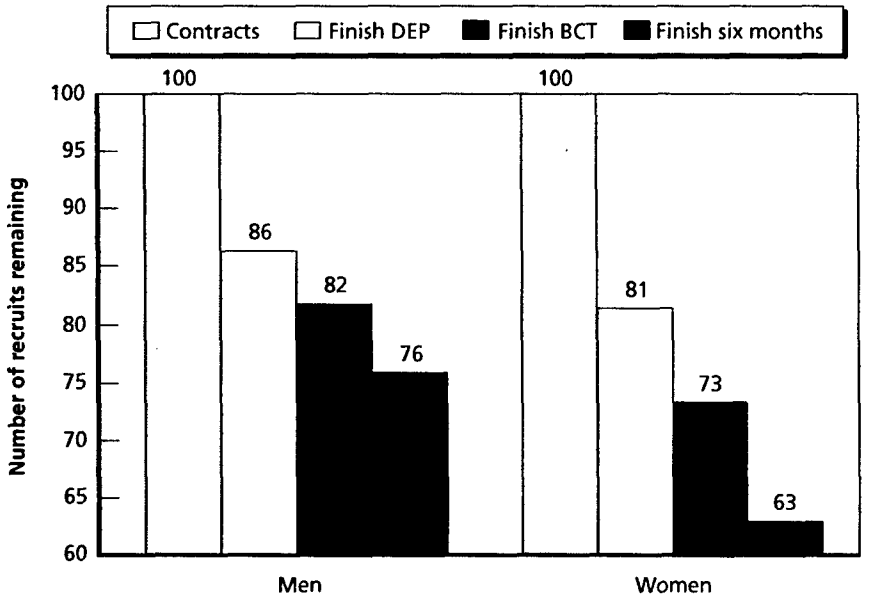
[1] We note that the Army does grant recruiters some incentive points for their recruits who subsequently graduate from BCT. Nevertheless, we can find only a weak connection between recruiter characteristics and early attrition.

Cumulative Effects of Different Types of Recruits on Manning Levels

The results show that some types of recruits are much more prone to succeed in the Army than are others. This means that the prospects of 100 recruits successfully completing DEP, BCT, and the first six months vary considerably from group to group.

Figure 6.3 shows that women have persistently higher loss rates at each step from DEP through the first six months. For each 100 contracts, more women than men leave during DEP, and the pattern continues in BCT and AIT. For each 100 men recruited, only 76 actually complete the first six months of active duty. For each 100 women recruited, only 63 will be left after six months. If the Army expected to fill the same number of first assignment positions with women as with men, they would need to recruit 83 men for each 100 women.

Figure 6.3
A Comparison of the Loss Profile for Men and Women



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The point of Figure 6.3 is not that the Army should stop recruiting women. They comprise about 20 percent of contracts and are a critical component of the modern Army. Nonetheless, the Army should address whether it could do a better job in helping recruits with conflicts that may lead to DEP or training attrition.

Recruits with GEDs do fine in DEP and BCT, but their loss rates begin to rise in the AIT period. Figure 6.4 shows that 100 new GED recruits translates into 69 recruits completing training. For high school graduates and seniors, 100 new recruits will translate into 74 recruits successfully completing training. This gap suggests that GED holders may have an initial enthusiasm for the Army, but they may struggle as the first term continues.

Figure 6.5 shows that the DEP length is a big factor in DEP attrition but has little bearing on how well recruits do in BCT or AIT. About 76 percent of new contracts with a two-month DEP are likely

Figure 6.4
Comparison of the Loss Profile for Recruits with Different Education Levels

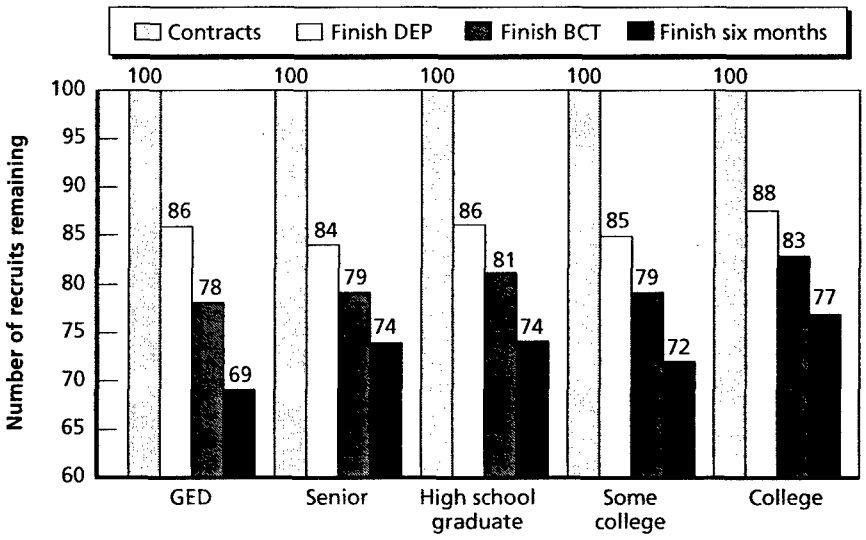

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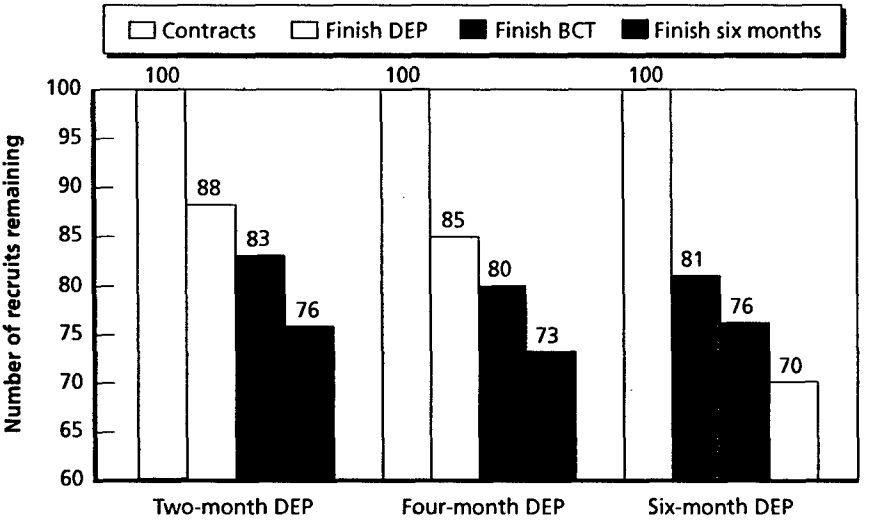
Figure 6.5
Comparison of the Loss Profile for Recruits with Different DEP Lengths



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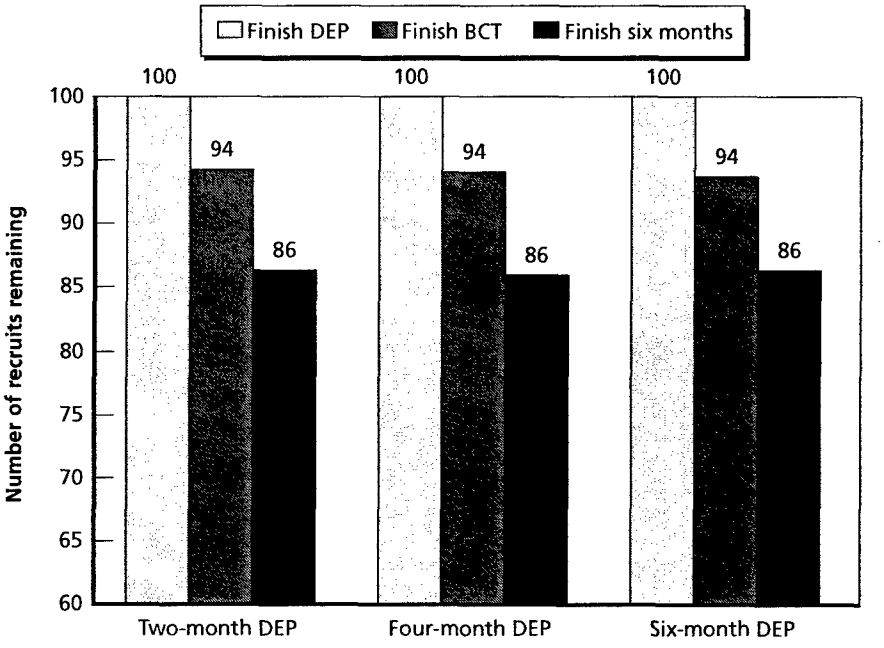
to make it to their first assignment, as compared with 70 percent of recruits with a six-month DEP. Most of this difference is related to the positive association between DEP length and DEP attrition. Figure 6.6 shows that if we look at the group of recruits who actually start active-duty service, then there is virtually no association between DEP length and either BCT or early attrition.

Implications of the Early Attrition Results for the Army

The attrition problems for women and recruits with GEDs persist from BCT into AIT. The Army should investigate whether programs that better prepare these groups for training, or that provide better counseling in training, could mitigate some of these problems.

The Army should collect more information on whether recruits are arriving at their first assignment prepared and motivated to do

Figure 6.6
Comparison of the Loss Profile for Recruits with Different DEP Lengths, Conditional on the Completion of DEP and Starting Active-Duty Service



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their jobs. The recent emphasis on holding down training attrition losses may have the unintended effect of pushing problems forward to the first assignment. Tolerating performance and conduct problems may have a detrimental effect on training and create an extra burden for unit leaders at the first assignment.

It might be particularly useful to collect data on why recruits leave, particularly women. If the reasons tended to be ones of unfulfilled or unrealistic expectations, then these could be addressed as part of the recruiting process. On the other hand, if reasons for departure are related to training issues in BCT, then the problems could be addressed there by altering the program of instruction or providing ad-

ditional training or counseling.[2] Furthermore, the Army might investigate whether there are any reliable diagnostic techniques to gauge motivation. Recruits from areas with high unemployment tend to have better completion rates, presumably because they have greater motivation.[3]

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[2] We thought that women who were recruited by women might have lower attrition rates than other women. The idea was that women recruiters might be better able to identify what attributes were important for women to succeed in the Army. In addition, women recruits might more easily identify with women recruiters and see themselves in the Army. We investigated this hypothesis and did not find any evidence that the attrition rates for women recruits were related to the gender of their recruiter.

[3] In this regard, we note that the Army has begun using an Assessment of Individual Motivation (AIM) test that endeavors to go beyond gender and other demographic factors to get better indications of which potential recruits are more at risk for attrition. Further research, using a methodology similar to the one we employ here, would be valuable in two ways. First and most obviously, it would enable objective evaluation of the test's ability to identify attrition risks. Second, it would enable evaluation of alternatives to mitigate the risks without needlessly screening out worthy applicants. In other words, a principal benefit of this testing may be in its ability to focus attention on correctible motivational or psychological problems that could be remediated in otherwise promising prospects. This would be a goal worth pursuing in any event, but especially in a tight recruiting market.

CHAPTER SEVEN

First-Term Attrition

Background

An important measure of a successful enlistment is the completion of the first term of service. BCT and AIT are training phases in which the Army teaches a soldier a MOS and prepares him or her for the first duty assignment. The Army needs soldiers to complete their obligation to recoup its recruiting and training investment.

First-term attrition for the FY1995 through FY2000 accession cohorts has averaged 36 percent. The lowest rate over these cohorts was 34 percent in FY1997, and the highest was 41 percent in FY1999. The loss rate for the FY2000 cohort was 37 percent, down slightly from the FY1999 level.[1]

This chapter continues our look at what types of factors affect first-term losses. The emphasis is on whether factors that matter earlier in the term continue to matter for the first term as a whole. We point out again that our methodology was specifically designed to account separately for different effects at different times, which enables us to find differences in the attrition features of different groups at different points in their progression through their first term. In particular, some types of recruits might struggle in training, but those

[1] Army year-by-year figures for attrition are slightly different, although the average is the same: FY1997, 36.3 percent; FY1998, 37.7; FY1999, 36.5; FY2000, 36.9; and FY2001, 33.6. This difference owes to the fact, as pointed out earlier in this report, that for our purposes it was more appropriate to group soldiers based on the time they were contracted rather than the time they actually reported for basic training.

individuals who are successful in training might do well in the remainder of the first term. Alternatively, some groups might do well in training and have problems later on in the first term.

What Factors Affect First-Term Attrition?

Recruit Characteristics

Recruit background remains the key driver of attrition when we look over the entire first term. The regression details are reported in Table 7.1. Figure 7.1 shows that women and dropouts continue to struggle

Table 7.1
Regression Results for Factors Affecting First-Term Attrition

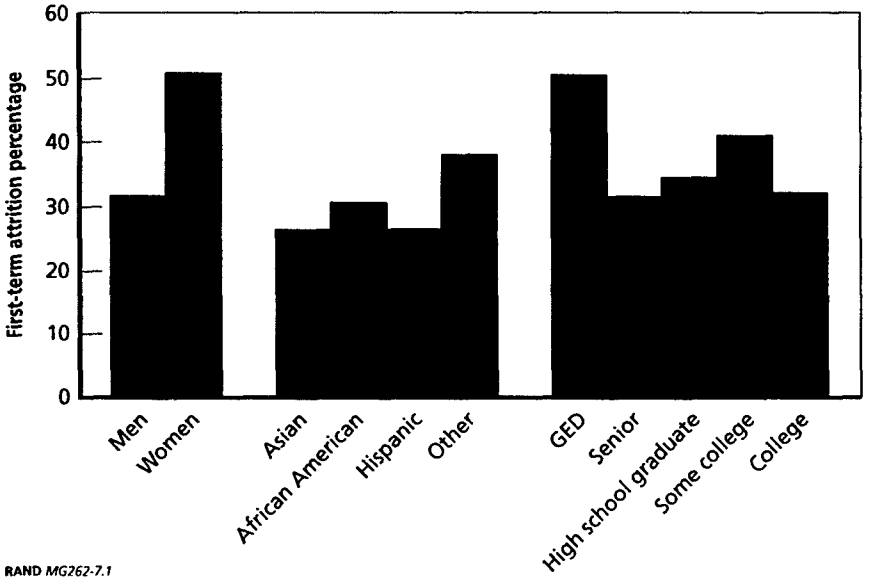
Variable	Coefficient	Standard Error	Effect	Means
Recruit characteristics				
Female	0.5044*	0.0078	0.1939	0.1990
African American	−0.1994*	0.0075	−0.0722	0.2323
Hispanic	−0.3208*	0.0106	−0.1117	0.0929
Asian	−0.3360*	0.0204	−0.1151	0.0207
Married with no children	0.0721*	0.0123	0.0270	0.0524
Married with children	0.0812*	0.0111	0.0305	0.0747
Single with children	0.0818*	0.0187	0.0307	0.0217
Age at time of contract	−0.0060*	0.0012	−0.0022	20.6454
Overweight	0.1299*	0.0057	0.0484	0.3760
GED	0.4165*	0.0110	0.1614	0.0812
Senior at time of contract	−0.0818*	0.0091	−0.0301	0.2750
Some college	0.1808*	0.0161	0.0689	0.0298
College degree	−0.0616*	0.0265	−0.0225	0.0257
Trigonometry	0.0592*	0.0120	0.0220	0.4141
Geometry	0.0660*	0.0115	0.0244	0.5195
AFQT	−0.0041*	0.0002	−0.0015	58.7784
Unemployment at contract	−0.0020	0.0022	−0.0008	5.6660
Unemployment at accession	−0.0029	0.0022	−0.0011	5.6015
Features of enlistment contract				
Army College Fund	−0.0166	0.0089	−0.0061	0.1998
No bonus	−0.0664*	0.0134	−0.0248	0.8315
Bonus amount (in thousands)	−0.0057*	0.0020	−0.0021	0.9676
Entry Paygrade E2	−0.0546*	0.0073	−0.0201	0.1796
Entry Paygrade E3	−0.1363*	0.0109	−0.0493	0.0767
Entry Paygrade E4–E6	−0.1687*	0.0260	−0.0604	0.0267
Two-year term	−0.2432*	0.0157	−0.0856	0.0438

Table 7.1 (continued)

Variable	Coefficient	Standard Error	Effect	Means
Three-year term	–0.0246*	0.0077	–0.0091	0.3918
Five-year term	0.0158	0.0128	0.0059	0.0612
Six-year term	0.0318*	0.0123	0.0118	0.0609
Months in DEP	–0.0166	0.0089	–0.0061	0.1998
Recruiting environment				
Contract in last 5 days of month	–0.0012	0.0075	–0.0005	0.2700
Contract on last day of month	0.0168	0.0106	0.0063	0.1087
Station/battalion met mission	–0.0147*	0.0060	–0.0054	0.3814
First contract for recruiter	0.0093	0.0157	0.0035	0.0373
Only contract for recruiter	0.0114	0.0456	0.0042	0.0039
Recruiter characteristics				
Assignment in home state	0.0222*	0.0064	0.0083	0.2362
College degree	–0.0248	0.0179	–0.0091	0.0247
Some college	0.0068	0.0122	0.0025	0.0535
GED	–0.0059	0.0421	–0.0022	0.0041
Female	–0.0116	0.0119	–0.0043	0.0586
African American	0.0045	0.0069	0.0017	0.3332
Hispanic	–0.0329*	0.0126	–0.0121	0.0592
Asian	–0.0991*	0.0354	–0.0360	0.0063
Married	0.0088	0.0090	0.0032	0.8423
Divorced	0.0063	0.0150	0.0023	0.0473
AFQT	–0.0002	0.0001	–0.0001	56.7977
Age	–0.0003	0.0008	–0.0001	29.5538
Recruiting experience	–0.0004	0.0003	–0.0002	14.2853
Accession year				
1996	0.0037	0.0100	0.0014	0.2563
1997	–0.0704*	0.0106	–0.0259	0.2834
1998	0.0367*	0.0110	0.0136	0.2593
1999	0.0364*	0.0137	0.0135	0.0848
BCT base				
Fort Knox	–0.0361*	0.0105	–0.0133	0.1169
Fort Leonard Wood	–0.0588*	0.0083	–0.0216	0.2451
Fort Sill	–0.0145	0.0107	–0.0054	0.1269
Fort Benning	0.0477*	0.0119	0.0178	0.1757
Occupation group				
Electronic Equipment Repair	–0.0620*	0.0142	–0.0227	0.0734
Communication/Intelligence	–0.0724*	0.0115	–0.0265	0.1109
Health Care	–0.1011*	0.0151	–0.0368	0.0645
Other Technical	–0.1526*	0.0186	–0.0548	0.0287
Functional Support/Admin	–0.0973*	0.0132	–0.0355	0.1131
Electrical/Mechanical Repair	–0.0939*	0.0109	–0.0343	0.1437
Craftsmen	–0.0399	0.0205	–0.0146	0.0218
Service/Supply Handler	–0.0391*	0.0118	–0.0144	0.1275
Intercept	0.0795	0.0445	0.0000	0.0000

*Significantly different from zero at the 5 percent confidence level.

Figure 7.1
Differences in First-Term (36-Month) Attrition by Gender, Race/Ethnicity, and Education Level



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throughout the entire first term. The first-term attrition rate for women is 51 percent, as compared with a rate of 31 percent for men. The gap between women and men has increased from 11 percentage points at the end of six months to a full 20 percentage points at the end of the first term.

The attrition rate for recruits with GEDs exceeds 50 percent—19 and 16 percentage points higher than for similar recruits who enter the Army as seniors or high school graduates, respectively. While GED holders fared pretty well in DEP and BCT, they have trouble down the road in AIT and at their first assignments.

First-term attrition rates also vary substantially with race/ethnicity. All other things being equal, about 26 percent of Asian and Hispanic recruits leave during their first term, as compared with 31 and 38 percent of African American and white non-Hispanic recruits, respectively.

Recruits who are married or have children have higher attrition rates—about three percentage points higher—than do comparable single recruits. The marriage/children effects are similar to those in early attrition, so the recruits who have family conflicts are most likely to leave the Army in training.

Features of Enlistment Contract

Figure 7.2 shows small differences in first-term attrition across the enlistment incentives and term length. ACF has no significant effect on first-term attrition. Bonuses are significant, but the range of differences is only about two percentage points on a base attrition rate of 36 percent.

Asch and Dertouzos (1994) used quasi-experimental data to look at the effect of ACF and bonuses on first-term attrition.[2] They used data from the Educational Assistance Test Program that was offered to Army recruits in FY1980 and the Enlistment Bonus Test Program that was offered to Army recruits from July 1982 to July 1984. Special ACF and bonus benefits were offered in some parts of the country (Army battalions), while recruits in other control areas were not offered these recruiting options. The experimental and control cells were balanced based on the recruiting potential of these areas in a pretest period of FY1979 for ACF and of July 1981 through June 1982 for bonuses. Asch and Dertouzos tracked the in-service experiences of recruits from the test and control groups. They found no statistically significant difference in the first-term attrition rate for areas where bonuses were offered and in the control cell. In addition, they found that first-term attrition rate was about three percentage points lower for recruits in ACF test cells than in control cells.

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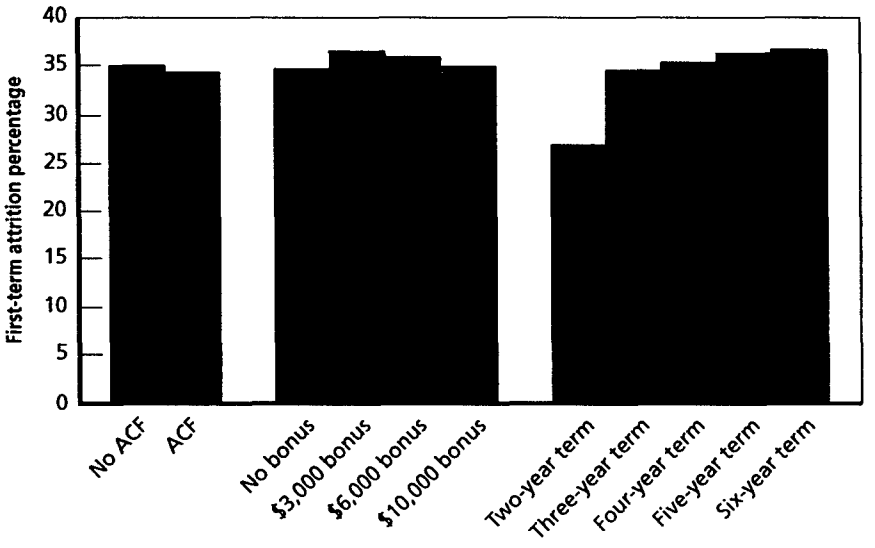
[2] The test design for the Educational Assistance Test Program balanced different Army recruiting battalions based on the recruiting market characteristics of these areas in a pretest period. The authors use the data from this recruiting experiment to look at other outcomes like first-term attrition and retention. The design is not an "experiment" over these outcomes, however, because the design does not balance battalions based on pretest differences in attrition and retention across geographic areas. We consider this to be a quasi-experimental study—the design is experimental, but it is not based on the outcomes considered in the Asch and Dertouzos (1994) study.

Figure 7.2
Differences in First-Term (36-month) Attrition by Enlistment Incentive Programs



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The differences between the results in Figure 7.2 and the Asch and Dertouzos (1994) study may reflect several factors. First, the Asch and Dertouzos study is based on data that is now over twenty years old. The underlying effect of bonuses and ACF may have changed in the interim. Second, the results of this study are the effects of bonuses and ACF conditional on accession, while the quasi-experimental approach of the earlier study estimates a broader effect of the enlistment options. Without individual data on enlistment decisions (i.e., data on the pool of possible enlistees), we were unable to disentangle the effects of the enlistment options on the enlistment decision from their effects on first-term attrition.

Two-year enlistees do have first-term losses several percentage points lower than do comparable recruits, but the gap is deceiving. As discussed in Chapter Two, we are following the traditional definition of first term as either the end of the term or the first 36 months in the

Army. This definition means that recruits with more than a two-year term are "at risk" for the full 36 months, but two-year enlistments are only "at risk" of first-term losses for 24 months. The 24-month attrition rate for recruits with enlistments that are greater than two years is 28 percent, as compared with 27 percent for two-year enlistees. In short, the rate of attrition losses per unit of time is nearly equal between two-year enlistees and recruits obligated for longer periods.

Recruiting Environment

The recruiting environment at the time of a soldier's enlistment does not affect first-term attrition. Of the five variables in the regression, only one is statistically significant. Recruits who signed up when their recruiting station made mission were about 0.5 percentage points less likely to complete their first term than were other similar recruits. The magnitude of this effect is very minor, since average first-term losses are 36 percent.

Recruiter Characteristics

As with recruiting environment, recruiter characteristics have little influence on first-term completion. The attrition evidence suggests that there is little difference among recruiters in their ability to identify recruits who are likely to be well matched with the Army and successfully complete their first term.

BCT Base, Cohort, and Occupation Effects

BCT base effects for the first term are small and show that first-term attrition rates are one or two percentage points lower for recruits at Forts Knox, Leonard Wood, or Benning than for comparable recruits assigned to Fort Jackson. All other things being equal, first-term rates are comparable for recruits assigned to Fort Jackson or Fort Sill.

The cohort effects show that the swings in first-term attrition are not simply a result of differences in the recruit composition from year to year. The adjusted trend shows that first-term attrition would have been 35 percent for a representative recruit in FY1995 and FY1996, 32 percent in FY1997, and 36 percent in FY1998 and FY1999.

Figure 7.3
Differences in First-Term (36-Month) Attrition by Occupational Group

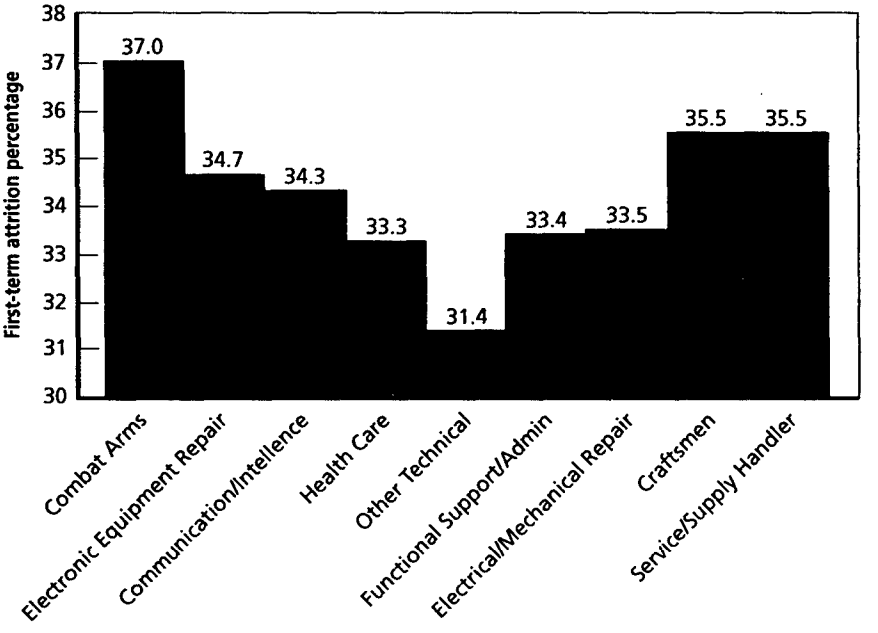

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Figure 7.3 shows the attrition differences across recruits' occupational groups. The results show that the attrition rates in combat jobs are somewhat higher than in other occupational groups. All other things being equal, attrition rates are lower in technical and maintenance jobs.

Several factors may explain why attrition rates are higher in combat jobs.

- **Cultural differences in how problems are handled.** Combat units may be less tolerant of performance and conduct issues. Operational requirements demand stricter rules and discipline.
- **Field exercises are arduous.** Combat troops face long days in the field and much time away from their families. In many cases, because exercises can unfold slowly, the soldiers find the sched-

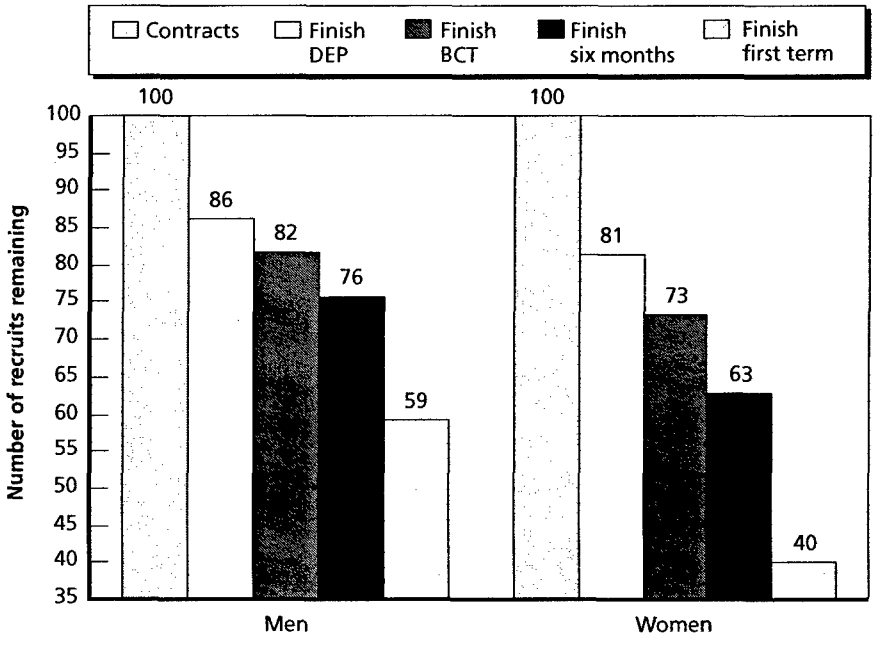
ule frustrating and get bored waiting for their part. Such issues may leave soldiers disenchanted with the Army.

- **Combat skills do not transfer into civilian jobs.** The returns to finishing out an enlistment term might be less in combat jobs because they don't have civilian counterparts.

Cumulative Effects of Different Types of Recruits on Manning Levels

Figure 7.4 shows that the attrition problems of women persist from DEP attrition through each step of training and into the post- training period. For each 100 contracts, 59 men complete the first term,

Figure 7.4
Comparison of the Loss Profile for Men and Women



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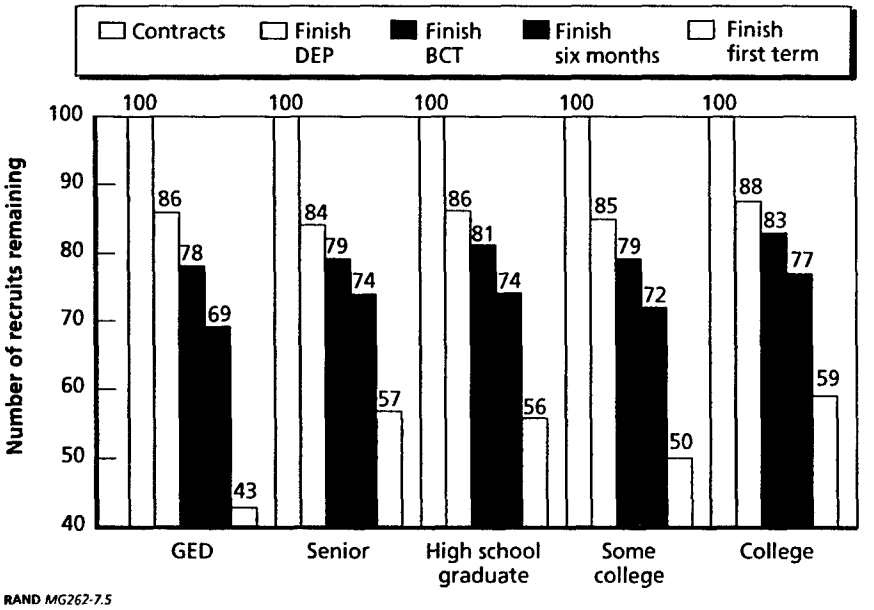
as compared with only 40 women. The implication is that every 68 contracts that the Army writes for men will yield as many first-term completions as 100 contracts for comparable women.

Recruits with GEDs have similar attrition profiles to seniors and high school graduates in DEP and BCT, but they have much higher attrition rates than do these other groups in AIT and after their initial training. The cumulative effect of these differences is illustrated in Figure 7.5. For each 100 GED contracts, only 43 soldiers remain at the end of the first term. The Army could generate similar numbers of first-term completions with only 75 senior or high school graduate contracts.

Figure 7.6 recasts Figure 7.5 to focus on recruits who successfully complete DEP and start active duty. The results show that for each 100 GED recruits to start active duty, only 50 will successfully complete their first term. This contrasts with completion rates of 65

Figure 7.5
Comparison of the Loss Profile for Recruits with Different Education Levels



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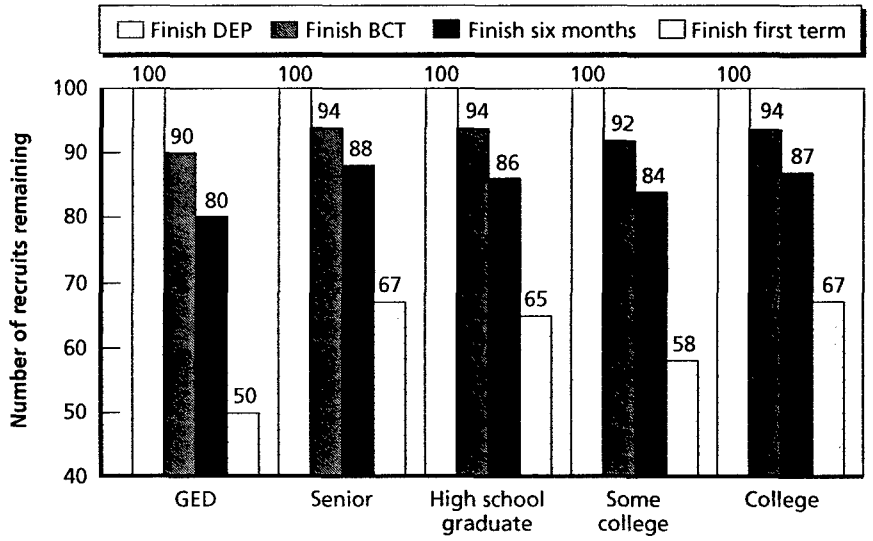
and 67 percent respectively for recruits who were high school seniors or graduates. GEDs fare only slightly worse than other recruits in BCT and early attrition, but their loss rates are much larger than for other groups after the completion of the first months of active-duty service.

GEDs and women have worse attrition profiles than high school graduates and men, but it is not evident that the Army should shift its recruiting effort away from these groups. Given the size of the recruiting mission, recruiting costs might increase dramatically if the mission was refocused on a greater share of male high school graduates. The current results do suggest, however, that the full cost of recruiting in these higher-risk categories should include the cost of greater turnover and the corresponding costs of recruiting and training replacement personnel. The high attrition rates of GEDs and

Figure 7.6
Comparison of the Loss Profile for Active-Duty Accessions with Different Education Levels



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women relative to other recruits also suggests that the Army could benefit from identifying the underlying reasons for these high loss rates and addressing them with improved programs and policies.

Implications of the First-Term Attrition Results for the Army

Over the long haul, the Army needs participation from women and GEDs to meet its mission. The high loss rates among these groups are costly to the Army and frustrating to the recruits who fail in such high numbers. The Army should investigate whether it can do a better job of identifying whether some groups of women and GED recruits are more prone to success than others. More importantly, however, the Army should develop programs to help women and GED holders succeed in the Army.[3]

ACF, bonuses, and term length have little bearing on first-term attrition rates. While these programs might help attract new recruits, the evidence shows that they do not affect first-term attrition. Of course, the availability of ACF monies for college may make recruits less likely to reenlist at the end of the first term.

Recruiting environment and recruiter characteristics have little or no effect on first-term attrition. Changes in recruiting station pressure or the skill mix of recruits are unlikely to have any discernable effect on how well new recruits do during the first term. One caveat, of course, is that changes outside the range of those considered in the seven cohorts of our analysis might have different consequences.

The Army should consider whether there are valid reasons why the first-term attrition rates in combat jobs are higher than those in other occupations. There is no "ideal" attrition number and no reason that attrition rates must be equal across all occupations. The extra strains and operational responsibilities might well justify the higher loss rates for combat jobs.

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[3] As we noted earlier, the Assessment of Individual Motivation (AIM) testing program may help the Army screen out candidates who are unlikely to succeed in the Army.

CHAPTER EIGHT

Promotion and Reenlistment

Background

Promotion Process

Promotion to sergeant is a key indication that a soldier is doing well in the Army and is prepared to assume leadership responsibility. Early enlisted promotions are decentralized and handled at the company level. For the most part, promotions to E2 (private), E3 (private first class), and E4 (specialist/corporal) are automatic as a soldier meets basic time-in-service (TIS) and time-in-grade (TIG) requirements. These promotions are basically automatic as long as a soldier is doing his or her job and is staying out of trouble.

E4s all receive the same pay, but they are divided into specialists and corporals. The distinction is that corporals have some leadership responsibility as a team or section leader. Corporals are more common in combat arms specialties, but support skills also have some corporals.

Most E4 promotions are concentrated around the 24-month TIS requirement. About 56 percent of soldiers who successfully reach the end of their first term are promoted to E4 between the 24th and 30th month of service.[1] About 30 percent of soldiers are granted

[1] This does not include soldiers who joined the Army with accelerated rank for civilian accomplishments like college credits, participation in junior ROTC, or referring other applicants to the Army for enlistment.

waivers and promoted before the 24-month TIS requirement. Finally, about 14 percent of soldiers have slow promotions to E4 and wait at least 31 months for promotion to specialist or corporal.

Unlike earlier promotions, E5 promotions are competitive across the Army. The promotions process is semi-centralized, with the unit providing some input, but the competition for these positions is Army-wide. Candidates for sergeant are assigned administrative points based on their achievements in the Army. These points are based on duty performance, awards and decorations, military education, civilian education, and military training. In addition, each candidate appears before a formal promotion board and is assessed for his or her skills, knowledge, and attitude. A score from this board is also added to the soldier's promotion points.

Congress sets the number of E5 positions each year as part of the Defense Authorization Act, and the Army allocates the positions across enlisted occupations. This process means that E5 authorizations in an occupation may vary from year to year depending on end-strength and on Army priorities. Since the Army has little or no lateral entry into occupations, these changes in authorizations mean that promotion opportunities may change as well.

Promotion opportunities vary considerably from occupation to occupation, because the Army promotes to fill vacancies. If an occupation is unpopular (perhaps because of long or arduous duty) or the job skill is transferable and highly valued in the civilian sector, then many soldiers will leave the occupation at the end of their term. This exodus means that remaining soldiers in the occupation will be promoted more quickly to fill the vacancies.

About 15 percent of first-term soldiers are promoted in the first term, but most will not be promoted until their second term in the Army. In recent cohorts, the average TIS for promotion to sergeant was about 55 months. While few soldiers actually reach E5 in their first term, most have been through several steps of the process and have substantial information on their prospects of quickly being promoted. Most soldiers are promoted to sergeant in the primary zone, which requires 36 months of service for promotion. Some "fast burners" are promoted in the secondary zone with as few as 18 months of

service. From the FY1995 to FY2001 cohorts, about a third of those soldiers promoted to sergeant during the first term were promoted with fewer than 36 months TIS.

Reenlistment Decision

The first-term reenlistment decision is important for the Army and for the individual soldier. By staying, the soldier enters the career force and will begin to assume increasing leadership responsibilities in the Army. The Army needs a productive core of enlisted personnel to serve in supervisory positions in different occupations. Its success in counseling and teaching younger soldiers is critical for the Army.

A soldier's promotion prospects are important for his or her reenlistment decision. Early promotion is an important financial incentive to stay. In addition, promotion to sergeant and the corresponding extra responsibilities represent a recognition of the soldier's military proficiency and signal potential for a successful career in the Army. Holding other factors equal, we would expect that recruits with better promotion prospects would be more likely to stay in the Army. In addition to promotion prospects, we expect reenlistment rates to differ with recruit characteristics and features of their enlistment contract. By the end of the first term, about 26 percent of soldiers are married, and about 15 percent have children. The Army offers many programs to help these young soldiers with family responsibilities, but it is important to understand whether family responsibilities might make members reluctant to stay in the Army. Enlistment incentives like ACF and bonuses may attract recruits with less commitment to the Army and a greater incentive to stay only one term. The analysis examines whether recruits with these incentives are less likely to reenlist than are other similar recruits.[2]

Previous research (Buddin, Levy, Hanley, and Waldman, 1992; Hosek and Totten, 2002) suggests that reenlistment rates are likely to

[2] Appendix B looks at the relationship between reasons for enlisting and first-term reenlistment intentions. This analysis is based on a survey of first-term Army soldiers. The analysis in this chapter relies on data constructed from various Army personnel files (as described in Chapter Two) and does not include information on reasons for enlisting.

vary considerably with occupation. Some occupations are inherently more difficult or more interesting than others are, and these factors are likely to affect the decision to stay in the Army. Strong civilian opportunities in a particular occupation may also affect reenlistment. For example, soldiers with training in medical, mechanical, or policing skills may find higher wages for similar work in the civilian sector. In contrast, combat arms skills do not readily transfer to civilian jobs, so these soldiers might face more uncertainty about what civilian wages they would earn in jobs unrelated to their military training.

Joint Model of Promotion and Reenlistment

The results in this chapter are based on a joint model of promotion to sergeant and first-term reenlistment. The statistical details of the model are described in Appendix C. A major feature of the model is that it incorporates information about the soldier's promotion prospects at the end of the first term into the reenlistment decision. In addition, the model examines whether unobserved factors (e.g., motivation, ability, and effort) that affect promotion are related to similar unobserved factors that affect the reenlistment decision.

In preliminary analysis, we found that recruiting environment and recruiter characteristics had little effect on first-term reenlistment. As we saw in earlier chapters, those variables had some significance for DEP and BCT, but they became unimportant as the term continued. For these reasons, this chapter presents a simpler reenlistment model that does not include the recruiting environment and recruiter characteristics.

The promotion and reenlistment results are reported in Table 8.1. The dependent variable in the promotion equation is the natural logarithm of TIS at promotion to E5. For most soldiers, this variable is truncated or censored at the end of their first term. These soldiers know that they have not yet been promoted and have some expectations about how long their promotion will take based on their progress in the promotion system and the promotion timing of similar soldiers. The statistical model adjusts for this censoring of promotion time and produces a statistical estimate of expected promotion time

Table 8.1
Regression Results for Factors Affecting Promotion and Reenlistment

Variable	Coefficient	Standard Error	Effect	Means
Promotion time to sergeant				
Female	0.0250*	0.0045	1.5026	0.1414
African American	−0.0107*	0.0040	−0.6371	0.2440
Hispanic	−0.0292*	0.0051	−1.7256	0.1084
Asian	0.0250*	0.0100	1.5175	0.0241
Age at time of contract	−0.0042*	0.0006	−0.2520	20.5162
GED	0.0307*	0.0077	1.8533	0.0588
Senior at time of contract	0.0048	0.0038	0.2857	0.3101
Some college	−0.0235*	0.0091	−1.3818	0.0243
College degree	0.0301*	0.0109	1.8172	0.0234
Trigonometry	−0.0084	0.0058	−0.5005	0.3974
Geometry	−0.0036	0.0054	−0.2174	0.5283
AFQT	−0.0024*	0.0001	−0.1405	57.3343
Deployed 0–1 months/year	−0.0145*	0.0062	−0.8604	0.0506
Deployed 1–2 months/year	−0.0101*	0.0044	−0.5990	0.1146
Deployed more than 3 months/year	0.0114	0.0063	0.6828	0.0710
Time to E4	0.0265*	0.0004	1.5823	25.0125
Electronic Equipment Repair	0.0302*	0.0057	1.7718	0.0586
Communication/Intelligence	−0.0039	0.0050	−0.2274	0.1103
Health Care	0.0985*	0.0068	5.9846	0.0488
Other Technical	−0.0365*	0.0085	−2.0712	0.0274
Functional Support/Admin	0.0138*	0.0054	0.8053	0.0980
Electrical/Mechanical Repair	0.1035*	0.0056	6.3046	0.1520
Craftsmen	0.1031*	0.0109	6.2810	0.0214
Service/Supply Handler	0.0470*	0.0055	2.7838	0.1231
Change in E5 authorization	−0.0208*	0.0096	−1.2420	−0.0337
Constant	3.6329*	0.0179		
Standard error (σ_1)	0.2951*	0.0017		
Reenlistment				
Female	0.0636*	0.0128	0.0253	0.1414
African American	0.3274*	0.0105	0.1300	0.2440
Hispanic	0.0420*	0.0140	0.0165	0.1084
Asian	−0.0473	0.0267	−0.0185	0.0241
Married with no children	0.1969*	0.0116	0.0781	0.1519
Married with children	0.4046*	0.0138	0.1603	0.1131
Single with children	0.2255*	0.0209	0.0895	0.0406
Age at time of contract	0.0124*	0.0018	0.0049	20.5162
Overweight	−0.0293*	0.0086	−0.0116	0.3554
GED	0.3234*	0.0189	0.1284	0.0588
Senior at time of contract	0.0321*	0.0127	0.0127	0.3101
Some college	0.0237	0.0267	0.0094	0.0243
College degree	−0.3685*	0.0368	−0.1394	0.0234
Trigonometry	0.0327*	0.0167	0.0130	0.3974
Geometry	0.0366*	0.0158	0.0145	0.5283
AFQT	−0.0061*	0.0003	−0.0024	57.3343
Unemployment at contract	0.0062*	0.0022	0.0025	5.9480
Unemployment at end of 1st term	0.0037	0.0025	0.0015	4.8860

Table 8.1 (continued)

Variable	Coefficient	Standard Error	Effect	Means
Army College Fund	0.0026	0.0125	0.0010	0.2453
No bonus	–0.0161	0.0237	–0.0197	0.8960
Bonus amount (in thousands)	0.0070	0.0040	0.0028	0.5008
Entry Paygrade E2	–0.0301*	0.0106	–0.0119	0.1861
Entry Paygrade E3	0.0579*	0.0158	0.0230	0.0763
Entry Paygrade E4	–0.2271*	0.0383	–0.0884	0.0208
Two-year term	–0.4855*	0.0196	–0.1865	0.0764
Three-year term	–0.1421*	0.0119	–0.0565	0.5188
Five-year term	0.0332	0.0262	0.0132	0.0276
Six-year term	0.1484*	0.0479	0.0590	0.0070
Months in DEP	0.0063*	0.0018	0.0025	3.9962
Deployed 0–1 months/year	0.0964*	0.0183	0.0384	0.0506
Deployed 1–2 months/year	–0.0036	0.0128	–0.0014	0.1146
Deployed more than 3 months/year	–0.0290	0.0158	–0.0115	0.0710
Electronic Equipment Repair	–0.0380	0.0200	–0.0149	0.0586
Communication/Intelligence	0.0038	0.0143	0.0015	0.1103
Health Care	0.2021*	0.0220	0.0804	0.0488
Other Technical	0.0837*	0.0254	0.0332	0.0274
Functional Support/Admin	0.1985*	0.0170	0.0789	0.0980
Electrical/Mechanical Repair	0.0922*	0.0129	0.0365	0.1520
Craftsmen	0.0289	0.0298	0.0114	0.0214
Service/Supply Handler	0.0572*	0.0148	0.0226	0.1231
Term ends in FY1999	0.0257	0.0147	0.0103	0.2626
Term ends in FY2000	–0.0296*	0.0150	–0.0118	0.3047
Term ends in FY2001	–0.1631*	0.0153	–0.0644	0.3216
Expected time to E5	–0.3820*	0.0282	0.0036	4.0878
Constant	1.3777*	0.1352		
Correlation	–0.3337*	0.0091		

NOTES: The natural logarithm of expected promotion time (in months) is used in the promotion equation and for "expected time to E5" in the reenlistment equation. The coefficients and standard errors are based on this logarithmic specification. For ease of interpretation, the "effects" for the promotion equation and "expected time to E5" are reported in month units.
* Significantly different from zero at the 5 percent confidence level.

for each soldier. The dependent variable in the reenlistment equation is a variable that indicates whether the soldier reenlists at the end of the first term.

The effects in Table 8.1 are defined in a similar manner to those for the earlier regression models. While the promotion equation is estimated in logarithmic form, the effects are translated into monthly units.

What Factors Affect Promotion to Sergeant?

Expected promotion time varies considerably for different soldiers. The median promotion time is 59 months, but about 25 percent of soldiers are promoted in the first 54 months and another 25 percent should expect promotion in more than 65 months. These expected promotion times in the model are somewhat greater than the actual time to promotion, because many soldiers with poor promotion prospects leave before the end of their term. Daula, Smith, and Nord (1990) show that the promotion TIS for soldiers promoted to E5 understates promotion prospects for a cohort, because soldiers leave the Army when their prospects are poor.

Actual TIS to E4 has a substantial effect on expected time to E5. Each one-month increment in TIS for promotion to E4 increases expected time to E5 by 1.6 months. Holding constant other factors, a soldier who is promoted to E4 at 21 months (the 25th percentile) is expected to reach sergeant at the 54th month. If a similar soldier is promoted to E4 at 27 months (the 75th percentile), then he or she will reach sergeant at the 64th month. The large effect of TIS for E4 promotion indicates that many of the key characteristics that the soldier's company uses to identify quality soldiers are also important for the next promotion.

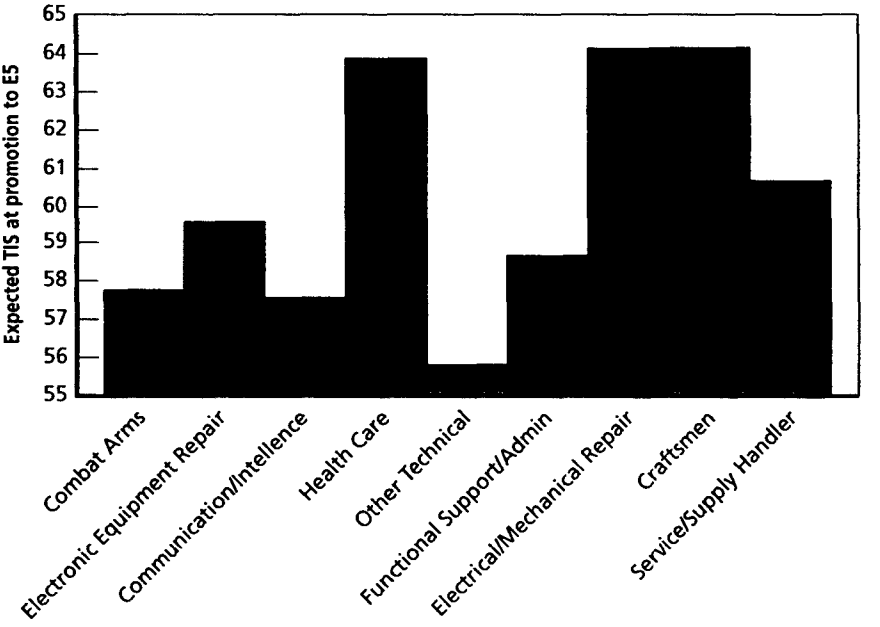
Promotion speed is significantly related to education level and aptitude, but the size of the effect is small. Promotion speed for high school seniors and graduates is nearly identical at about 59.5 months. GEDs have expected promotion times that are about 61.3 months. Surprisingly, the model shows that college graduates have promotion times nearly as slow as GEDs. Higher AFQT leads to shorter promotion times, but the results suggest that a 10 percentage point increase in AFQT will shorten E5 promotion time by only 1.4 months.

Gender and race/ethnicity also have small effects on promotion speed. Women are promoted to sergeant about 1.5 months later than otherwise comparable men. The average TIS at promotion for comparable African American, Asian, Hispanic, and other recruits is 59.3, 61.4, 58.2, and 59.9 months, respectively.

Promotions also vary little with operational and humanitarian deployments during the first term. Soldiers who had limited deployments (less than one month per year) have promotion times 0.9 months shorter than those of soldiers who were not deployed. Recruits with one to two months of deployments per year are promoted about 0.6 months sooner than are similar recruits with no first-term deployments.

Figure 8.1 shows that promotion speed differs somewhat across occupation group. Soldiers in combat arms can expect to reach sergeant about six months sooner than comparable members in health care, electrical/mechanical repair, and craftsmen specialties. The other technical and communications/intelligence groups have even faster promotion times than those for combat soldiers.

Figure 8.1
Differences in Promotion Speed by Occupation Group



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Finally, the promotion equation includes a control for the proportional year-to-year change in authorizations for each Army job. The Army promotes to fill vacancies, so an increase in sergeant positions in a job will increase promotion speed in the occupation. The results show that a change in E5 authorizations is positively related to promotion speed, but the magnitude of the effect is very small.

What Factors Affect First-Term Reenlistment?

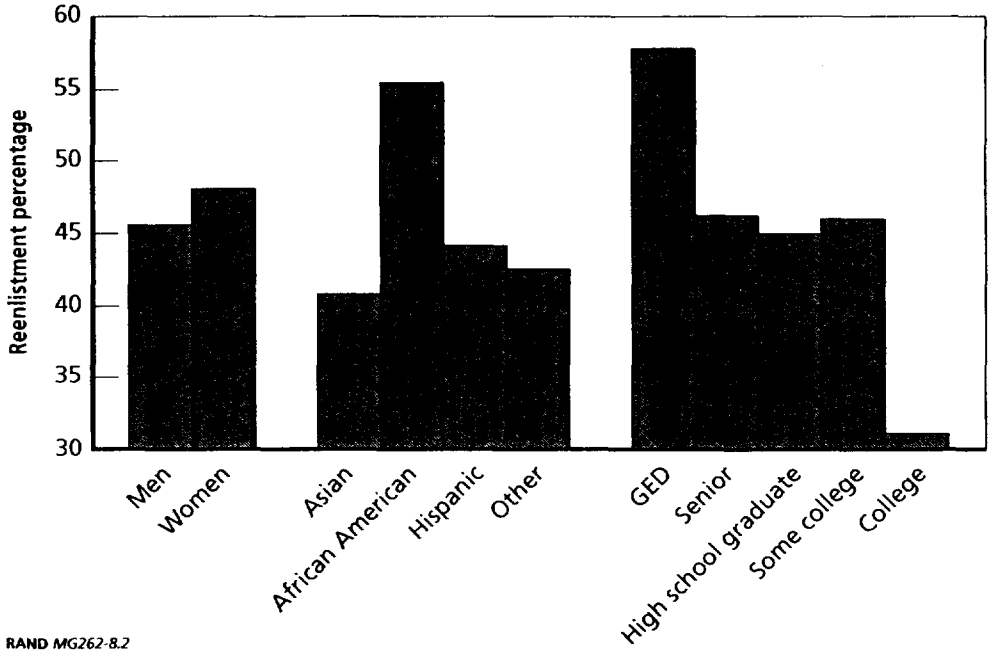
Recruit Characteristics

Figure 8.2 shows the effects of several demographic factors on reenlistment, while holding constant other factors in the promotion and reenlistment model. In particular, the reenlistment model adjusts for promotion opportunities. While women have higher attrition rates throughout the first term, those women who complete their term have reenlistment rates about 2.5 percentage points higher than do comparable men. This result suggests that many women prefer their career opportunities in the Army to potential civilian alternatives.

African American soldiers are much more likely to reenlist than all other groups. About 56 percent of African American soldiers stay, as compared with 41, 43, and 44 percent of Asian, white non-Hispanic, and Hispanic recruits, respectively. This large difference may reflect limited civilian opportunities for some African American soldiers or stronger interest in the military lifestyle.

The reenlistment rates for seniors, high school graduates, and soldiers with some college credits are about 46 percent. About 58 percent of GEDs stay in the Army at the end of their first term. This high reenlistment rate is likely to reflect much worse civilian job opportunities for these soldiers (Cameron and Heckman, 1993). The results show that only about 31 percent of college graduates reenlist in the Army. Apparently, these soldiers are not satisfied with their career prospects in the Army and see greater reward for their college degree in the civilian sector. Reenlistment rates are much higher for

Figure 8.2
Differences in Reenlistment by Gender, Race/Ethnicity, and Education Level



soldiers who are married or have children than for single recruits. Holding constant other factors, the reenlistment rate for a single recruit with no dependents is only 42 percent, as compared with 50, 51, and 59 percent for single parents, married nonparents, and married parents, respectively. The results suggest that for soldiers who have made it through their first term, the Army is "family friendly," or at least soldiers with families see the stability and support of the Army as preferable to their civilian alternatives.

Aptitude has little effect on reenlistment decisions. The results show that soldiers with better math background (i.e., they took geometry or trigonometry in high school) have reenlistment rates about one percentage point higher than those who did not take those classes. AFQT is inversely related to reenlistment, but each 10 percentage point change in AFQT only reduces reenlistment by about two percentage points.

The current unemployment rate has no statistically significant effect on reenlistment. The small effect of unemployment on reenlistment might be a little misleading, however, because the unemployment rate is only a crude indication of the civilian employment prospects for a particular recruit. There is some long-term effect of the unemployment rate at the time of the enlistment contract on reenlistment, but a two percentage point increase in that historical unemployment rate is only associated with a 0.5 percent increase in reenlistment. The small effect of the initial unemployment rate suggests that recruits who were initially motivated to join the Army for economic reasons are slightly more likely to stay than are other similar recruits.

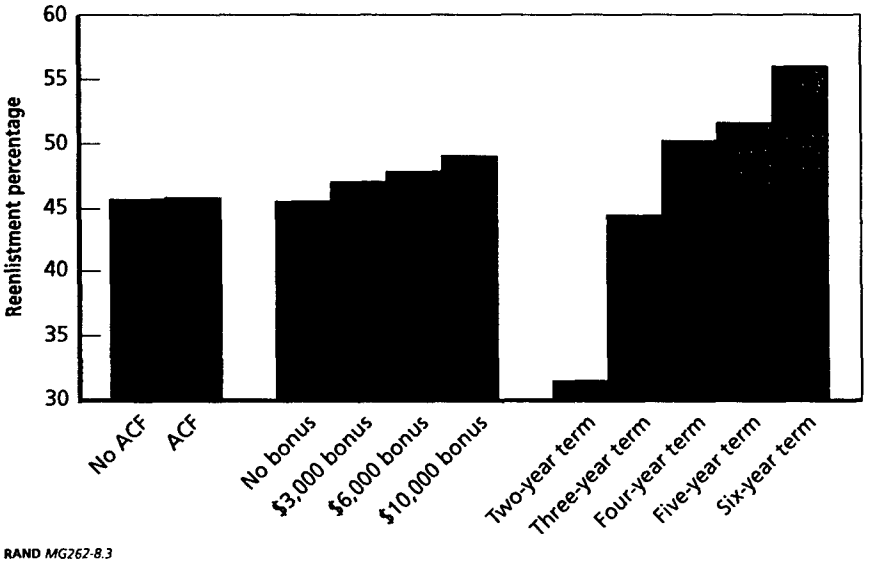
Features of Enlistment Contract

ACF participation has no bearing on the reenlistment decision, after controlling for other factors in the reenlistment model. ACF is generally thought to discourage soldiers from reenlisting, since the program provides extra money for full-time college attendance. It may be that recruits are attracted to the Army by ACF benefits, but their interest in college attendance may wane over their enlistment term. As a result, the availability of ACF money may have little effect on their reenlistment. Alternatively, as discussed in Chapter Two, many recruits in the ACF program would have enlisted even without the benefit, and they never planned to attend college after the first term.

The bonus results in Figure 8.3 are also contrary to expectation. A hypothesis held by some observers is that bonus recipients may be motivated by monetary incentives and thus have less commitment to the Army and only plan to serve a single term. In fact, the results show that bonus recipients are more likely to reenlist than are similar other soldiers. While bonuses may be a key factor in enlistment, the option might also be attracting recruits who subsequently develop a strong attachment to the Army.

In their study of ACF and bonuses, Asch and Dertouzos (1994) found that these two programs lowered first-term retention by five and three percentage points, respectively. Their results are based on a

Figure 8.3
Differences in Reenlistment by Enlistment Incentive Programs



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quasi-experimental analysis of data from the Educational Assistance and Enlistment Bonus Test Programs of the early 1980s (see discussion in Chapter Seven).

Several possible explanations may explain the differences between the results summarized in Figure 8.3 and the Asch and Dertouzos (1994) study.

- **Different cohorts.** The effects of the enlistment options might have changed over the twenty years or so since the initial experimental programs.
- **Experimental variation.** We did not have access to experimental variation for our study, so our estimated model examines the effects of the programs conditional on accession. Experimental variation would help to disentangle the enlistment, attrition, and retention effects of ACF and bonus programs. Unfortunately, experiments are rare, so it is difficult to understand

whether the effects of ACF and bonuses in the early 1980s persist today.

- **Possible design problems.** The test designs of the early 1980s were based on balancing the recruiting potential of Army recruiting battalions. The designs did not consider the first-term retention of recruits from these areas, or the relationship between retention and economic conditions in the recruit's home at the time of reenlistment. This suggests that economic conditions in the test cells may have systematically changed between the pre-test period and the time of the retention decision three to five years later. If so, the results may be distorted and misleading.

In sum, the current approach and the earlier quasi-experimental approach of Asch and Dertouzos (1994) both have limitations—with such a large gap in time between the studies, it is unclear how to directly compare the results.

Figure 8.3 also shows that reenlistment rates for two- and three-year terms are much lower than for other enlistment terms. Only 32 percent of two-year enlistees reenlist, as compared with 50 percent of four-year enlistees. Similarly, the reenlistment rate for three-year enlistees is six percentage points lower than for four-year enlistees. Individuals who choose short terms by implication have less commitment to the Army, so it is not surprising that many of these recruits leave at the end of their first term. At the other extreme, recruits with five- and six-year enlistments are both more likely to stay in the Army than are other similar recruits with shorter enlistment terms.[3]

[3] Term length and occupation are frequently linked with one another. Term lengths are long for some occupations where training times are long, so the Army can recoup a return on the training investment. Similarly, two-year enlistments are generally restricted to occupations with short training times. If a prospective recruit's decision is tied to a specific occupation, then he or she may have little discretion in choosing a term length. Alternatively, if the recruit is willing to accept a range of jobs or has a limited understanding of what some jobs entail, then he or she has discretion in choosing a job with a term length that satisfies his or her career objectives.

Deployments

The results show that short deployments are positively related to reenlistment. Recruits who have a short humanitarian or operational deployment have reenlistment rates about four percentage points higher than other recruits with no first-term deployments. The positive effect of deployments is dissipated, however, for recruits who are deployed for more than one month per year. These recruits with longer deployments are neither more nor less likely to stay than recruits who do not deploy at all. These deployment results are similar to those of Hosek and Totten, 1998 and 2002.

Occupations

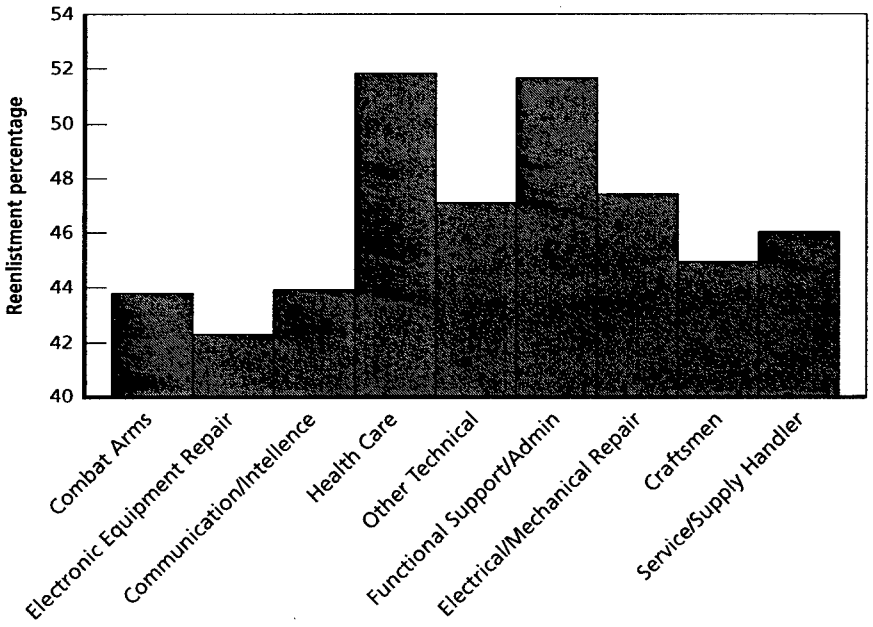
Figure 8.4 shows a considerable range of reenlistment rates in different occupation groups. The reenlistment results are adjusted for differences in promotion opportunities by occupation, so the effects more likely reflect the attractiveness of each occupation relative to the opportunities available for an individual with those skills in the civilian sector. The average reenlistment rate over these analysis cohorts was about 46 percent. Reenlistment rates are two to three percentage points below average in combat arms, electronic equipment repair, and communications/intelligence. About 52 percent of health care and functional support/administration soldiers reenlist at the end of their term.

Expected Time to E5 and Correlation

Slow promotions are a deterrent to first-term reenlistment. About 47 percent of recruits who expect promotion at the 54th month (the 25th percentile of the promotion distribution) will reenlist, as compared with 44 percent of comparable recruits who expect promotion at the 64th month (the 75th percentile of the promotion distribution).

The magnitude of the promotion effects is much more pronounced, however, if we consider the reenlistment rates for soldiers who have been promoted to sergeant in their first term. The mean promotion time for four-year enlistees who make sergeant in the first

Figure 8.4
Differences in Reenlistment by Occupation Group



RAND *MG262-8.4*

term is 38 months. The model results indicate that 53 percent of recruits with promotions at 38 months will reenlist, as compared with the overall rate of about 46 percent.

The correlation between unobserved factors in the promotion and reenlistment equations is –0.33. Many factors like soldier motivation, effort, and job proficiency are either unmeasured in our analysis or measured indirectly through other factors in the model. The correlation indicates that *on average,* factors that tend to make an individual soldier more likely to get promoted early are also likely to make the solder more likely to reenlist. This result is somewhat encouraging for the Army, since it means that the soldiers who are doing better than one would expect from their characteristics are more likely to stay than are other soldiers.

Implications of the Promotion and Reenlistment Results for the Army

Promotion to sergeant provides an important signal to soldiers that they are succeeding in the Army and have good prospects for an Army career. The evidence shows that early promotions do substantially increase the reenlistment rates of first-term soldiers.

Although promotion incentives are important for reenlistment, the evidence we have analyzed above does not prove, unfortunately, that the soldiers being promoted, and thus reenlisting at higher rates, are the ones the Army most wants to retain for a longer career. To support its promotion selection processes, the Army has an elaborate system of awarding points for various measures of achievement and performance. Some of these measures are objective and quantitative (scores on the fitness test or weapons qualification), but many are subjective evaluations by supervisors or the promotion board. In our view, the Army would be well served by a careful review of how well these measures work and how the components are aggregated into total points.[4] The key issue is to identify what factors are important for success as a leader in each occupation and to design a promotion system that offers rewards for reaching well-specified milestones that indicate or correlate with leadership potential. It will also be important to account for the possibility that some soldiers may be declining to compete for promotion because they have already decided not to reenlist. If this group includes soldiers with high leadership potential, focusing retention efforts more on them would have clear benefits.

Enlistment incentives have little adverse effect on first-term reenlistment. The main factors affecting reenlistment are soldier characteristics, military occupation, and promotion speed. After controlling for these factors, ACF participants are neither more nor less likely to leave at the end of the first term. Bonus recipients are actu-

[4] As part of this project, we had access to total promotion points through the EMF, but the information was not available for all eligible soldiers and was not used in our analysis. We did not have access to more detailed information on the various components of total points and how they changed over time as the soldier gained more experience in the Army.

ally more likely to stay than other comparable recruits who do not receive an enlistment bonus. These results suggest that the Army should not be concerned that ACF and bonus incentives attract recruits who are prone to leave at the end of the first term.

The Army should collect more specific information about working conditions and schedules in different occupations that could be used to identify the reasons for reenlistment differences across occupations. Conventional wisdom is that some occupations are more arduous or demanding than others, but there is no specific information on how various dimensions of the job affect reenlistment. In some cases, the adverse conditions might be inherent to the duties of the occupation, but reforms might be warranted to modify situations that have severe reenlistment consequences. New deployment information on days away from home is a step toward better documenting stressors for soldiers. This information could be augmented by better measures of operating tempo and working conditions in various occupations. Some Army jobs will always have long days and adverse conditions, but it would be useful to understand how these factors affect reenlistment decisions.

CHAPTER NINE

Conclusions and Recommendations

The key factors affecting first-term success are the demographic and background characteristics of recruits who enter the Army each year. In DEP and at each stage of the first term, some groups are much more likely to succeed than others. Given the size of Army accession requirements, the Army cannot afford to exclude most at-risk groups of recruits, but it can benefit from targeted efforts to reduce attrition and the costs of early losses. For example, the Army could further restrict GED accessions to jobs with short training times, or recruit a subset of GEDs with more potential for first-term success.[1] The short training times would reduce the costs if the recruit does leave early, and some groups of GEDs (perhaps those who have demonstrated steady civilian employment) might be more prone to succeed in the Army.

In addition, the Army should investigate the nature of in-service problems for various groups and evaluate whether programs could be designed to help at-risk recruits adjust to the Army. These policies might resolve conflicts or improve performance, while helping the Army maintain a quality first-term force.

Most features of the enlistment contract have a modest effect on first-term success, and most of the effect concentrates early in the term. ACF participation is inversely correlated with DEP and training

[1] GEDs are typically required to have a higher aptitude score than similar seniors or high school diploma graduates. Aptitude has little effect on attrition, however, so this tougher recruiting standard for GEDs does little to assure first-term losses. See also our earlier comments on AIM testing.

attrition, but the size of the effect diminishes after training. The results show that ACF participation is unrelated to reenlistment at the end of the term, so ACF recruits are not fleeing in droves for college at the end of their first term. Bonus recipients have much lower DEP attrition than do similar nonrecipients, but bonuses have little effect on first-term attrition. Reenlistment rates are positively related with first-term bonuses.[2] Finally, attrition rates vary little with the length of the initial enlistment term. Taken together, the results show that a liberal use of enlistment incentives and shorter enlistments to attract more recruits is not likely to attract recruits who are prone to leave the Army after their first term.

Recruiting environment has little effect on how well recruits do in the first term. There is some evidence that recruiting station pressures affect DEP and training attrition, but the effects wane later in the term.

The results show little evidence that some types of recruiters are better at identifying good matches for the Army than are others. Recent policies to emphasize younger recruiters or return recruiters to their home state may well pay dividends if these recruiters generate more contracts. Our evidence shows that these types of policies have little downstream effect on how well recruits do during the first term. For example, an Omaha senior might relate well with a young recruiter from the Omaha area and be more likely to join the Army, but we see little evidence that this recruit is better matched and more likely to succeed in the first term. If some types of recruiters were more effective than others in attracting new recruits, then our finding that recruiter characteristics have little effect on attrition would bolster Army policies to select younger recruiters or target them to their home area. Alternatively, we might have found that the new policies were producing superficial success, i.e., the recruiters might have attracted more recruits who were only marginally interested in the

[2] The enlistment options results are conditional on the decision of the recruit to access to the Army. A more complete assessment of the effects of these options would require individual-level data on enlistment decisions and experimental variation in options offered to different recruits.

Army and had high attrition rates once they realized that they did not really want to serve.

Early promotions have a strong effect on first term enlistment and help the Army retain a leadership core for the enlisted force. Some soldiers are identified as "fast burners" by their units and given early promotions to E4. These soldiers continue on a fast track for sergeant and are much more likely to reenlist than are similar soldiers who are promoted at an average pace.

Recommendations

Shorten DEP for high school seniors. The current policy of recruiting seniors early in their graduation year results in high DEP attrition rates. The policy does indeed "lock in" a key recruiting group that does well during the first term. However, seniors' interest in and commitment to the Army change over their senior year, and the Army (as well as the other services) has always struggled to keep DEP losses down. The Army and other services should consider a coordinated policy change to delay signing up seniors until later in the school year when their plans are more firmly entrenched. Perhaps the services should not write contracts for seniors until March of their senior year.[3]

Reexamine fitness training in the context of its connection with overall first-term success. The Army has used special fitness training from base to base and from year to year. The evidence shows that individuals who fail their initial fitness screen at the reception station are unlikely to complete the first six months of training. The Army should gain earlier visibility on incoming recruits with potential fitness problems, encourage remediation of these problems prior to entry, and develop more uniform standards for FTU participation. In addition, the Army should monitor the various programs more care-

[3] The Army tries to recruit early only those high school seniors who score in the upper half on aptitude tests. The effect of this particular approach on attrition is marginally positive, certainly not enough by itself to warrant a change in approach.

fully to assure that their combined effects actually improve the prospects of subsequent training success. It may be the case that recruits who fail to meet some minimum threshold of fitness are unsuitable for the Army or take too long to prepare for training, so they should be screened out by tougher recruiting standards.

Monitor effectiveness and implementation of training standards and policies. The large swings in BCT attrition rates suggest that inconsistent training standards and policies are an issue for the Army. The evidence provides no support for the idea that tougher standards at some places or times have any bearing on the first-term success of recruits who complete training. The Army should carefully investigate what training conduct and performance standards are consistent with subsequent AIT and post-training success. The goal should not be to standardize or lower rates arbitrarily but rather to identify what problems can be mediated and what problems are precursors to longer-term failure.

Investigate policies to help at-risk demographic groups. Army recruiting cannot afford to screen out women, GEDs, and others who have high attrition rates. The Army needs to investigate whether it can better inform these groups about what is expected of them in the Army. In addition, the Army should develop programs to help at-risk recruits adapt to the Army and show them how they can improve their chances of success. As we have already noted, the Assessment of Individual Motivation and similar tools of this genre might be helpful in these endeavors.

Monitor the promotion system and its interactions with retention. Promotion speed is an important factor in shaping first-term reenlistment and the quality of the career enlisted force. We did not analyze the intricacies of the Army promotion system, but early promotion is an important sign of progress and encourages soldiers to reenlist. If the promotion system correctly identifies "quality" early in the term, then early promotions are shaping an effective core of unit leadership. Alternatively, however, if potential leaders are overlooked in the first term, they may be frustrated and leave the Army. Given the critical role played by promotions, the Army should review whether the system is identifying what factors are important for lead-

ership success in each occupation and strengthen incentives for reaching well-specified milestones.

Build an automated system to track recruit problems, remediation efforts, and results. Current automated data files provide too little information about attrition. The reported reasons for attrition are vague (e.g., trainee discharge or unsatisfactory performance) and inconsistently recorded. The Army should develop more objective criteria that can be more uniformly implemented. In addition, the Army should track a history of problems and remediation efforts that were taken to address those problems. This new information system would help the Army identify the underlying reasons for attrition and structure policies to address those reasons. The tracking information would also help the Army sort out what types of interventions and mediations are effective in helping at-risk recruits. We recommend early and continuing efforts to connect this information with information gleaned from AIM testing, pre-accession fitness metrics, and other assessments.

Implement new programs with an eye to evaluation. As the Army implements reforms in training and first-term personnel policy, it should carefully document the timing, nature, and application of the reforms, so the success or failure of each can be assessed. "Good ideas" are often implemented quickly or in a haphazard manner, so the implications of the reform cannot be measured. While full-scale evaluation of each change is not necessary, careful documentation provides the potential for substantive follow-up of the reasons for a shift in training success, attrition, or reenlistment behavior.

Collect detailed information about working conditions in Army occupations. Current analysis of attrition, promotion, and reenlistment decisions is hampered by little systematic information about working conditions in different occupations. The information would include data on weekly hours, schedule uncertainty, dangers, personnel tempo, time away from home, and other factors that are likely to differ across occupations. This would help the Army identify what specific attributes of military jobs are related to attrition or reenlistment problems. While jobs will always have some negative aspects, the information could be used to consider policies for restruc-

turing or reducing some activities that are particularly detrimental for personnel manning.

APPENDIX A

Differences in Recruit Characteristics on BCT and Early Attrition from Base to Base

The results in Chapters Four and Five are based on the assumption that the effects of demographic characteristics on BCT and early attrition do not vary by BCT base. The assumption is that women or overweight recruits or high-AFQT recruits are neither more nor less prone to complete BCT and the first six months at one base than at another. In this appendix, we compare the effects of demographic factors on BCT and early attrition and investigate whether these effects vary from place to place.

Tables A.1 and A.2 show the probit regression results for BCT and early attrition by BCT base and overall. The results show some statistically significant differences in effects from base to base, but the magnitude of the differences is minor. For example, women have higher attrition rates than men at Forts Jackson, Sill, and Wood. The probit coefficients represent the change in the index score at each base. The predicted gap between women and men is 4.7, 3.3, and 4.3 percentage points at Forts Jackson, Sill, and Wood, respectively. Most of the results are qualitatively the same from place to place.

Table A.1
BCT Attrition Regressions (Probits): Overall and by BCT Base

Variable	(1) Overall	(2) Benning	(3) Jackson	(4) Knox	(5) Sill	(6) Wood
Recruit characteristics						
Female	0.3335*		0.3486*		0.2473*	0.3195*
	(0.0077)		(0.0098)		(0.0351)	(0.0141)
African American	−0.2906*	−0.2036*	−0.3263*	−0.2697*	−0.2580*	−0.2664*
	(0.0082)	(0.0263)	(0.0117)	(0.0300)	(0.0252)	(0.0174)
Hispanic	−0.3627*	−0.2924*	−0.3986*	−0.3393*	−0.3812*	−0.3433*
	(0.0124)	(0.0302)	(0.0191)	(0.0438)	(0.0362)	(0.0271)
Asian	−0.3481*	−0.2195*	−0.4004*	−0.3796*	−0.3025*	−0.3701*
	(0.0249)	(0.0589)	(0.0384)	(0.0910)	(0.0709)	(0.0564)
Married w/ no children	0.1181*	0.1427*	0.1266*	0.0736	0.1146*	0.1161*
	(0.0134)	(0.0359)	(0.0205)	(0.0475)	(0.0417)	(0.0277)
Married with children	0.1504*	0.1706*	0.1986*	0.0921*	0.0968*	0.1083*
	(0.0117)	(0.0312)	(0.0178)	(0.0395)	(0.0359)	(0.0251)
Single with children	0.0808*	0.1159*	0.0463	0.0110	0.0903	0.1267*
	(0.0201)	(0.0489)	(0.0319)	(0.0667)	(0.0588)	(0.0429)
Age at time of contract	0.0037*	0.0074*	−0.0032	0.0121*	0.0161*	0.0075*
	(0.0013)	(0.0033)	(0.0019)	(0.0043)	(0.0039)	(0.0026)
Overweight	0.0644*	0.0713*	0.0692*	0.0487*	0.0903*	0.0414*
	(0.0065)	(0.0157)	(0.0102)	(0.0216)	(0.0194)	(0.0139)
GED	0.2502*	0.2473*	0.2599*	0.2229*	0.2387*	0.2760*
	(0.0100)	(0.0217)	(0.0166)	(0.0312)	(0.0282)	(0.0229)
Senior at time of contract	−0.0745*	−0.1353*	−0.0255*	−0.1817*	−0.0889*	−0.1074*
	(0.0080)	(0.0202)	(0.0122)	(0.0295)	(0.0252)	(0.0171)
Some college	0.0180	0.0658	0.0177	0.0775	0.0133	−0.0310
	(0.0158)	(0.0382)	(0.0243)	(0.0548)	(0.0490)	(0.0343)
College degree	−0.1975*	−0.0482	−0.2192*	−0.0078	−0.1222	−0.2479*
	(0.0234)	(0.0662)	(0.0345)	(0.0964)	(0.0831)	(0.0449)
Trigonometry	0.0515*	0.0858*	0.0493*	0.0107	−0.0055	0.0746*
	(0.0135)	(0.0372)	(0.0203)	(0.0514)	(0.0408)	(0.0279)
Geometry	0.0522*	0.1157*	0.0512*	0.0330	−0.0396	0.0617*
	(0.0132)	(0.0371)	(0.0196)	(0.0510)	(0.0406)	(0.0270)
AFQT	−0.0045*	−0.0043*	−0.0048*	−0.0038*	−0.0034*	−0.0049*
	(0.0002)	(0.0005)	(0.0003)	(0.0006)	(0.0006)	(0.0004)
Unemployment at contract	−0.0085*	−0.0005	−0.0038	−0.0197*	−0.0121	−0.0172*
	(0.0026)	(0.0068)	(0.0040)	(0.0091)	(0.0084)	(0.0055)
Unemployment at accession	0.0032	−0.0070	−0.0027	0.0153	0.0105	0.0133*
	(0.0026)	(0.0069)	(0.0041)	(0.0088)	(0.0082)	(0.0054)

Table A.1 (continued)

Variable	(1) Overall	(2) Benning	(3) Jackson	(4) Knox	(5) Sill	(6) Wood
Fiscal year of accession						
1996	−0.0449*	−0.0077	−0.0863*	0.0511	−0.1185*	−0.0025
	(0.0129)	(0.0323)	(0.0208)	(0.0426)	(0.0376)	(0.0267)
1997	−0.2150*	−0.3412*	−0.2394*	0.0730	−0.2140*	−0.1969*
	(0.0132)	(0.0337)	(0.0211)	(0.0420)	(0.0390)	(0.0274)
1998	0.1016*	−0.4449*	0.3087*	0.2812*	−0.1425*	0.0385
	(0.0127)	(0.0334)	(0.0199)	(0.0401)	(0.0400)	(0.0276)
1999	−0.0530*	−0.3567*	0.0743*	−0.0794	−0.0680	−0.0859*
	(0.0133)	(0.0330)	(0.0209)	(0.0440)	(0.0387)	(0.0296)
2000	−0.1710*	−0.4001*	−0.1559*	−0.1287*	−0.0174	−0.1581*
	(0.0136)	(0.0327)	(0.0217)	(0.0449)	(0.0381)	(0.0300)
2001	−0.1446*	−0.4856*	−0.1863*	−0.1353*	0.0126	0.0931*
	(0.0135)	(0.0325)	(0.0219)	(0.0447)	(0.0378)	(0.0287)
BCT base						
Fort Knox	−0.4267*					
	(0.0121)					
Fort Leonard Wood	−0.2125*					
	(0.0081)					
Fort Sill	−0.3052*					
	(0.0109)					
Fort Benning	−0.3590*					
	(0.0097)					
Constant	−1.0926*	−1.3410*	−0.9873*	−1.7689*	−1.6791*	−1.3973*
	(0.0343)	(0.0878)	(0.0522)	(0.1168)	(0.1033)	(0.0713)
Observations	412,994	87,067	134,036	49,527	53,054	89,278

*Significant at the 5 percent confidence level.

Table A.2
Early Attrition Regressions (Probits): Overall and by BCT Base

Variable	(1) Overall	(2) Benning	(3) Jackson	(4) Knox	(5) Sill	(6) Wood
Recruit characteristics						
Female	0.4119*		0.4101*		0.3560*	0.4294*
	(0.0065)		(0.0086)		(0.0274)	(0.0114)
African American	−0.2887*	−0.2479*	−0.3357*	−0.2613*	−0.2281*	−0.2688*
	(0.0065)	(0.0178)	(0.0101)	(0.0208)	(0.0186)	(0.0138)
Hispanic	−0.3459*	−0.2958*	−0.3920*	−0.3240*	−0.3237*	−0.3439*
	(0.0094)	(0.0199)	(0.0161)	(0.0293)	(0.0256)	(0.0211)
Asian	−0.3552*	−0.3162*	−0.3797*	−0.4093*	−0.2978*	−0.3705*
	(0.0189)	(0.0403)	(0.0319)	(0.0613)	(0.0517)	(0.0431)
Married w/ no children	0.0984*	0.1064*	0.1198*	0.0924*	0.0888*	0.0721*
	(0.0111)	(0.0264)	(0.0180)	(0.0348)	(0.0328)	(0.0232)
Married with children	0.1274*	0.1033*	0.1958*	0.0626*	0.0845*	0.0948*
	(0.0097)	(0.0232)	(0.0158)	(0.0296)	(0.0281)	(0.0208)
Single with children	0.0695*	0.0827*	0.0460	0.0444	0.0758	0.0950*
	(0.0162)	(0.0356)	(0.0277)	(0.0472)	(0.0458)	(0.0357)
Age at time of contract	0.0017	0.0048*	−0.0050*	0.0136*	0.0074*	0.0024
	(0.0010)	(0.0024)	(0.0017)	(0.0032)	(0.0031)	(0.0022)
Overweight	0.0939*	0.0682*	0.1073*	0.0703*	0.1335*	0.0893*
	(0.0051)	(0.0109)	(0.0089)	(0.0154)	(0.0146)	(0.0112)
GED	0.2942*	0.2705*	0.2843*	0.2701*	0.3426*	0.3333*
	(0.0080)	(0.0155)	(0.0147)	(0.0228)	(0.0219)	(0.0192)
Senior at time of contract	−0.1157*	−0.1616*	−0.0663*	−0.1312*	−0.1511*	−0.1449*
	(0.0063)	(0.0138)	(0.0106)	(0.0202)	(0.0188)	(0.0137)
Some college	0.0212	0.0292	0.0109	0.0471	−0.0068	0.0386
	(0.0126)	(0.0271)	(0.0210)	(0.0402)	(0.0382)	(0.0274)
College degree	−0.2030*	−0.1453*	−0.2079*	−0.1076	−0.1050	−0.2339*
	(0.0186)	(0.0478)	(0.0288)	(0.0729)	(0.0638)	(0.0354)
Trigonometry	0.0688*	0.1028*	0.0597*	0.0247	0.0642*	0.0741*
	(0.0108)	(0.0252)	(0.0175)	(0.0360)	(0.0320)	(0.0223)
Geometry	0.0641*	0.1066*	0.0581*	0.0202	0.0399	0.0667*
	(0.0105)	(0.0253)	(0.0169)	(0.0359)	(0.0318)	(0.0216)
AFQT	−0.0053*	−0.0051*	−0.0050*	−0.0042*	−0.0047*	−0.0068*
	(0.0002)	(0.0003)	(0.0003)	(0.0005)	(0.0004)	(0.0003)
Unemployment at contract	−0.0053*	−0.0040	−0.0001	−0.0127*	−0.0048	−0.0117*
	(0.0021)	(0.0047)	(0.0035)	(0.0065)	(0.0063)	(0.0045)
Unemployment at accession	−0.0009	−0.0070	−0.0044	0.0069	0.0030	0.0045
	(0.0021)	(0.0048)	(0.0035)	(0.0064)	(0.0062)	(0.0044)

Table A.2 (continued)

Variable	(1) Overall	(2) Benning	(3) Jackson	(4) Knox	(5) Sill	(6) Wood
Fiscal year of accession						
1996	0.0298*	0.0959*	−0.0441*	0.2002*	−0.0829*	0.0608*
	(0.0106)	(0.0260)	(0.0183)	(0.0315)	(0.0286)	(0.0219)
1997	−0.1215*	−0.2533*	−0.0952*	0.1591*	−0.2271*	−0.1517*
	(0.0107)	(0.0264)	(0.0182)	(0.0316)	(0.0296)	(0.0223)
1998	0.1664*	−0.0609*	0.2932*	0.3720*	−0.0092	0.1168*
	(0.0105)	(0.0250)	(0.0179)	(0.0306)	(0.0296)	(0.0227)
1999	0.0408*	−0.0695*	0.1145*	0.1245*	−0.0062	−0.0237
	(0.0109)	(0.0252)	(0.0186)	(0.0317)	(0.0294)	(0.0242)
2000	−0.0693*	−0.1273*	−0.0987*	0.0262	−0.0296	−0.0875*
	(0.0110)	(0.0250)	(0.0190)	(0.0324)	(0.0295)	(0.0243)
2001	−0.0727*	−0.2572*	−0.1083*	0.0986*	−0.0513	0.0747*
	(0.0109)	(0.0249)	(0.0192)	(0.0319)	(0.0296)	(0.0240)
BCT base						
Fort Benning	0.0048					
	(0.0074)					
Fort Knox	−0.1537*					
	(0.0091)					
Fort Sill	−0.1003*					
	(0.0086)					
Fort Leonard Wood	−0.0881*					
	(0.0068)					
Constant	−0.8037*	−0.7581*	−0.7076*	−1.3575*	−1.0366*	−0.8196*
	(0.0277)	(0.0628)	(0.0455)	(0.0847)	(0.0799)	(0.0582)
Observations	412,994	87,067	134,036	49,527	53,054	89,278

*Significant at the 5 percent confidence level.

APPENDIX B

Reenlistment Intention Patterns and Reasons for Initial Enlistment

In addition to the personnel data described in Chapter Two, we used survey data to examine how different motivations for joining the Army affected first-term reenlistment intentions. Survey data offer the potential of a rich set of explanations for why a soldier enlists or reenlists in the Army. While personnel files normally only record who joined or stayed, survey data are generally used to collect more detail for how those decisions were made. The expense of survey data collection means that this type of data is collected intermittently, however, and for small samples of the military population.

The 1999 Active Duty Survey (ADS) was the source of our survey data (Wright, Williams, and Willis, 2000). The survey was fielded late in 1999 and collected information on a random sample of enlisted and officer personnel in all service branches and years of service. The survey was restricted to members who were beyond their initial entry training. We participated in the selection of questions for the survey and proposed questions, based on our previous survey and analysis of personnel issues (Tiemeyer, Wardynski, and Buddin, 1999). The survey contains information on a broad set of member demographics, service experiences, and individual attitudes. The survey had about 36,000 respondents, but our analysis is restricted to about 1,600 first-term enlisted soldiers in the Army.

The survey information is useful because it can be used to see whether initial motivations for enlistment are related to first-term reenlistment intentions. The survey asked soldiers to report the "primary reasons" that they initially joined the Army. The respondents

were asked to mark all reasons that applied, where the possible responses ranged from "desire to serve your country" to "training in skills useful for civilian employment" to "money for college." Table B.1 shows what percentage of soldiers picked various primary reasons for joining as well as the two reasons that were the most important. Money for college and education benefits was the most often reported reason for joining and was listed by 66 percent of soldiers. Many other reasons were also listed, however, with ten of the twenty-three reasons listed by over a third of all soldiers. When recruits list their most important reasons for joining, money for college and education benefits is picked by 39 percent of recruits, as compared with the next most common pick of personal maturity and growth at 16 percent.[1]

First-term reenlistment information is included in two related survey questions. One question asks soldiers what their enlistment intentions were when they first entered the Army. The question has three category alternatives: plan to leave after first term, not sure if stay or leave, and plan to stay after first term. The second question asks the soldier's present intention to stay in the Army at the end of the first term. The question has five category alternatives: very unlikely, unlikely, neither likely nor unlikely, likely, and very likely.

An ordered probit model was used to relate initial and current reenlistment intentions to reasons for joining. This statistical technique recognizes the ranked scale of the intention outcomes: if intentions are stable after joining the Army, then various reasons have consistent effects on both initial and current reenlistment intentions. The expectations of new recruits about the Army might be unrealistic, however, so their attitude toward staying in the Army might change considerably over the first term as they learn about life in the Army.

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[1] The reasons for joining are not necessarily representative of the reasons that individuals joined the Army over the late 1990s. First, the question is retrospective and responses might be distorted by the passage of time. Second, the sample is restricted to first-term members who have not yet left during the first term. Respondents who leave early may have joined for different reasons than those who stay.

Table B.1
Reasons for Joining the Army

Reasons for Joining	Primary Reason	Most Important Two Reasons
Respite/break		
Trouble in school or needed break	17	3
Away from family or hometown	38	12
Time to decide what to do	43	13
Military lifestyle		
Always wanted to be in military	29	9
Military tradition in family	21	4
Desire to serve your country	36	12
Image given by military personnel	10	1
Job benefits		
Few or no civilian job opportunity	16	5
Pay and allowances	14	3
Retirement pay and benefits	12	1
Security and stability of job	37	11
Opportunity to work in specific job	21	5
Family benefits	19	8
Travel and new experiences	54	13
Education and training		
Train in skills for civilian job	39	14
Money for college and education benefits	66	39
Challenge		
Test self physically or mentally	42	9
Challenging and interesting work	37	5
Parents' encouragement	9	1
Personal growth and maturity	44	16
Other	13	4

Table B.2 shows the probit regression results for first-term reenlistment. The model also includes controls for demographic characteristics that might distort the relationship between intentions and the reasons for joining. The results show that most reasons have no significant bearing on either initial or current reenlistment intentions. This probably reflects the fact that new entrants have limited information about life and work in the Army.

Table B.2
Effect of Enlistment Reasons for Initial and Current Reenlistment Intentions

Variable	Initial Intentions	Current Intentions
Trouble in school or needed break	−0.1831 (0.0974)	−0.0411 (0.0920)
Away from family or hometown	0.1812* (0.0765)	0.2255* (0.0700)
Time to decide what to do	−0.2346* (0.0721)	−0.1719* (0.0676)
Test self physically, mentally	0.0865 (0.0826)	0.0178 (0.0759)
Challenging, interesting work	0.0399 (0.0848)	0.2760* (0.0780)
Always wanted to be in military	0.4605* (0.0832)	0.0521 (0.0844)
Military tradition in family	0.2033* (0.0877)	0.1031 (0.0883)
Parents' encouragement	0.0296 (0.1158)	−0.0617 (0.1202)
Desire to serve your country	0.2091* (0.0807)	0.1492 (0.0783)
Image given by military personnel	0.1121 (0.1200)	−0.1183 (0.1145)
Few or no civilian job opportunity	0.0366 (0.0891)	0.0700 (0.0830)
Pay and allowances	−0.2456* (0.1216)	0.1219 (0.0999)
Retirement pay and benefits	1.0606* (0.1319)	0.2490* (0.1179)
Security and stability of job	0.3457* (0.0785)	0.3667* (0.0738)
Opportunity to work in specific job	0.0604 (0.0982)	−0.0973 (0.0893)
Train in skills for a civilian job	−0.1332 (0.0769)	−0.0400 (0.0744)
Family benefits	0.0160 (0.0989)	0.1900 (0.0999)
Travel and new experiences	0.0201 (0.0735)	0.0964 (0.0680)
Money for college and education benefits	−0.3947* (0.0751)	−0.2978* (0.0706)
Personal growth and maturity	0.1309 (0.0776)	−0.0399 (0.0710)

Table B.2 (continued)

Variable	Initial Intentions	Current Intentions
Other	0.0203	–0.0120
	(0.1073)	(0.0947)
Current age	0.0265*	0.0212
	(0.0111)	(0.0114)
Hispanic	–0.0122	0.1026
	(0.0986)	(0.0901)
African American	0.0389	0.2519*
	(0.0961)	(0.0881)
Female	0.1355	–0.0273
	(0.0930)	(0.0848)
Some college	–0.0940	–0.0978
	(0.0808)	(0.0804)
Associate degree	–0.1638	–0.0915
	(0.2083)	(0.1418)
Bachelor's degree	–0.2664	–0.2723
	(0.1398)	(0.1440)
Single	–0.1130	–0.0882
	(0.0826)	(0.0781)
Divorced	0.2778	0.2511
	(0.1716)	(0.1957)
One child	–0.0406	–0.4071
	(0.2060)	(0.2218)
Two children	0.1950	–0.0474
	(0.2206)	(0.2339)
Three or more children	0.1985	–0.2359
	(0.2359)	(0.2345)
Child less than age 5	0.0589	0.2517
	(0.1989)	(0.2083)
Observations	1,542	1,545

*Significant at the 5 percent confidence level.
Standard errors are in parentheses.

The results are generally consistent across intentions measures, but recruits who entered for military lifestyle reasons are more prone to reassess their interests in the Army. Table B.1 shows that recruits who listed "always wanted to be in the military," "military tradition in family," and "desire to serve country" all have much higher initial intentions to remain in the Army than do recruits who entered for other reasons. The results for current intentions, however, show that

none of these military lifestyle reasons are significantly related to current intentions to remain in the Army. Apparently, many recruits who join for idealistic commitment to the military change their commitment level after experiencing day-to-day life in the Army.

The results for education and training issues are somewhat surprising. As expected, recruits who joined for "money for college and education benefits" have lower reenlistment intentions (both initially and currently) than other comparable recruits. But about 39 percent of recruits say they join to "train in skills for a civilian job," and these recruits are neither more nor less likely to stay in the Army than other recruits. Again, the story seems to be that young recruits join for various reasons, but their views of the Army change considerably as they gain experience in the Army.

APPENDIX C

Formal Model of Promotion and Reenlistment Behavior

A bivariate probit model is used to jointly estimate the factors that influence promotion to sergeant (E5) and first-term reenlistment (Buddin et al., 1992; Buddin and Kapur 2002). A two-equation framework is used in which promotion is the first equation and reenlistment is the second equation. The equations are linked, since the reenlistment decision is a function of a soldier's expected promotion time at the end of the first term and because unmeasured factors (like motivation, effort, and commitment to the Army) are likely to simultaneously affect both promotion and reenlistment. This bivariate probit model is an extension of the "instrumental variable" approach to the case where the promotion outcome is censored at the end of the first term (i.e., many soldiers have not yet been promoted) and the reenlistment outcome is dichotomous. The modeling approach adjusts for the endogeneity of expected promotion time in the reenlistment equation.

The expected time to promotion is modeled as

$$\ln T_i^* = \beta_1 X_i + \delta Z_i + \varepsilon_{1i}, \qquad \text{(C.1)}$$

where the natural logarithm of an individual's expected time in service at promotion to sergeant *(T)* is modeled as a function of a (column) vector of observed variables, X_i, a (row) vector of unobserved parameters β_1, a set of instrumental variables, Z_i and their corresponding parameters δ, and an unobserved random error ε_{1i}. The explanatory variables in X_i include the service member's demographic

characteristics and features of their enlistment contract. X_i also includes variables on the soldier's occupation group and months deployed during the first term. Z_i denotes the instrumental variables that are excluded from the reenlistment equation, since these variables have no direct effect on reenlistment and affect reenlistment only indirectly through their effect on promotion timing. The subscript i denotes an individual. The latent variable T_i^* is a continuous measure of the expected time to promotion. A truncation problem arises in estimation, because many soldiers have not yet been promoted at the end of their first term. Let E_i be the month of service when the soldier's enlistment term expires. Then, the observed promotion time (in months) is

$$T_i = \begin{cases} T_i^* \text{ if } T_i^* < E_i \\ E_i \text{ otherwise} \end{cases}. \qquad \text{(C.2)}$$

For soldiers promoted by the end of their first term, we observe the expected promotion time. For soldiers not yet promoted, we observe only that they were not yet promoted at E_i.

The probability of staying in the Army (first-term reenlistment) is modeled as a function of the same set of X variables and the expected time to sergeant at the end of the first term. The probability of staying is a latent (i.e., not directly observed) random variable. The individual's probability of staying (denoted by S_i^*) is modeled as a function of a (column) vector of observed variables, X_i, a (row) vector of unobserved parameters β_2, the natural logarithm of the expected time to sergeant ($\ln T_i^*$) and its corresponding parameter γ, and an unobserved random error ε_{2i}.

$$S_i^* = \beta_2 X_i + \gamma \ln T_i^* + \varepsilon_{2i}. \qquad \text{(C.3)}$$

The variable S_i^* is a latent variable that measures the probability of staying. However, we only observe the action of staying, so the observed variable, S_i, is truncated as a zero-one variable:

$$S_i = \begin{cases} 1 \text{ if } S_i^* > 0 \\ 0 \text{ otherwise} \end{cases}. \tag{C.4}$$

The instrumental variables, Z, in this model include several factors that affect promotion prospects and have no direct effect on reenlistment.

We make a number of stochastic assumptions in order to estimate the bivariate probit model. In particular, we assume that ε_1 and ε_2 are jointly bivariate normal with zero means and variance covariance matrix

$$\Sigma = \begin{bmatrix} \sigma_{11} & \sigma_{12} \\ \sigma_{12} & \sigma_{22} \end{bmatrix},$$

that is, $V(\varepsilon_1) = \sigma_{11}$, $V(\varepsilon_2) = \sigma_{22} = 1$, and $\text{Cov}(\varepsilon_1, \varepsilon_2) = \sigma_{12} = \rho$. Notice that the variance of ε_2 is normalized to one since the scale of S_i is not observed.

Substituting equation (C.1) into (C.3) and solving yields the reduced-form reenlistment equation:

$$S_i^* = (\gamma\beta_1 + \beta_2)X_i + \gamma\delta Z_i + \gamma\varepsilon_{1i} + \varepsilon_{2i}.$$

Define the standardized reduced-form error vector η as

$$\eta_1 = \varepsilon_1 / \sigma_1$$
$$\eta_2 = (\gamma\varepsilon_{1i} + \varepsilon_{2i}) / \sqrt{1 + \gamma^2\sigma_{11} + 2\gamma\sigma_{12}},$$

and the standardized vector of critical points, μ, is

$$\mu_1 = (E_i - \beta_1 X_i - \delta Z_i) / \sigma_1$$
$$\mu_2 = -\left[(\gamma\beta_1 + \beta_2)X_i + \gamma\delta Z_i\right] / \sqrt{1 + \gamma^2\sigma_{11} + 2\gamma\sigma_{12}}.$$

Then, the likelihood function is given by

$$L = \sum_{i=1}^{n} \ln \Phi_2 \left(q_{1i} \mu_{1i},\ q_{2i} \mu_{2i},\ q_{1i} q_{2i} \rho_i \right),$$

where q_{1i} is 1 if the individual has been promoted and -1 otherwise, q_{2i} is 1 if the individual stays and -1 otherwise, and Φ_2 is the bivariate normal cumulative density function.

Maximization of this bivariate probit maximum-likelihood function yields consistent, asymptotically efficient estimates of the model coefficients and the covariance matrix. The correlation between the errors in the two equations, ρ, can be interpreted as the interdependence of the unobserved components in the promotion and stay equations.

Due to the nonlinear nature of the bivariate probit maximum-likelihood model, interpretation of the coefficients is not as straightforward as with linear models. For the continuous variables such as age and AFQT, we report partial derivatives to aid interpretation. The partial derivatives can be interpreted as the effect of a one-unit increase in the X variable on the outcome variable being considered. For binary variables, such as female or overweight in the stay equation, we use the model coefficients to predict the difference in the probability of staying when the binary variable is switched from zero to one.

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